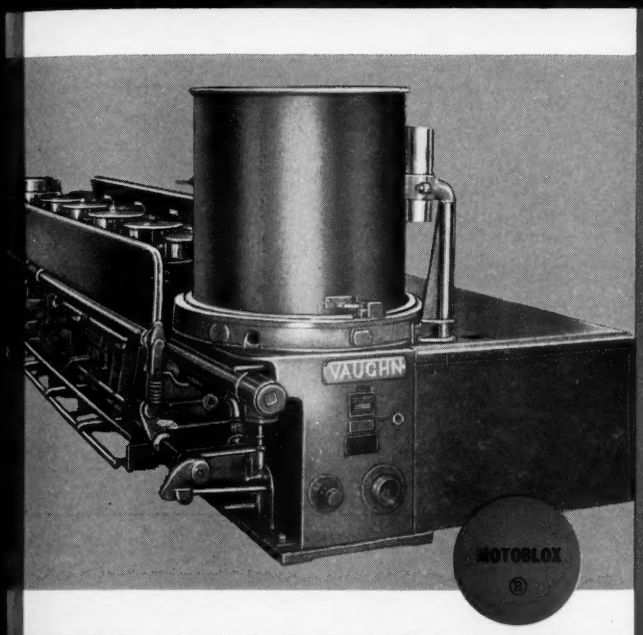
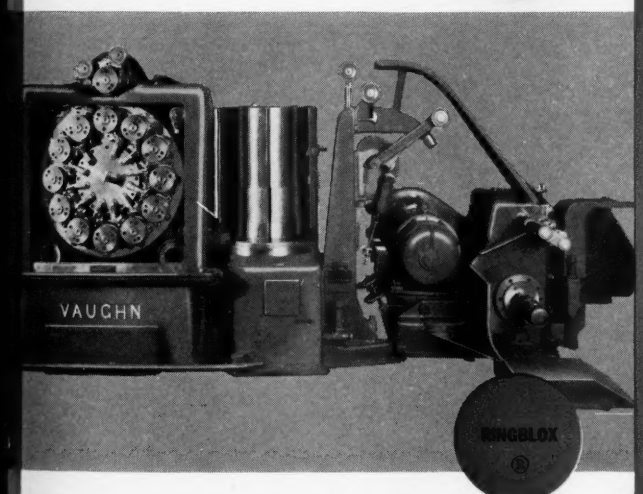
SEPTEMBER 1952

WIRE AND WIRE PRODUCTS

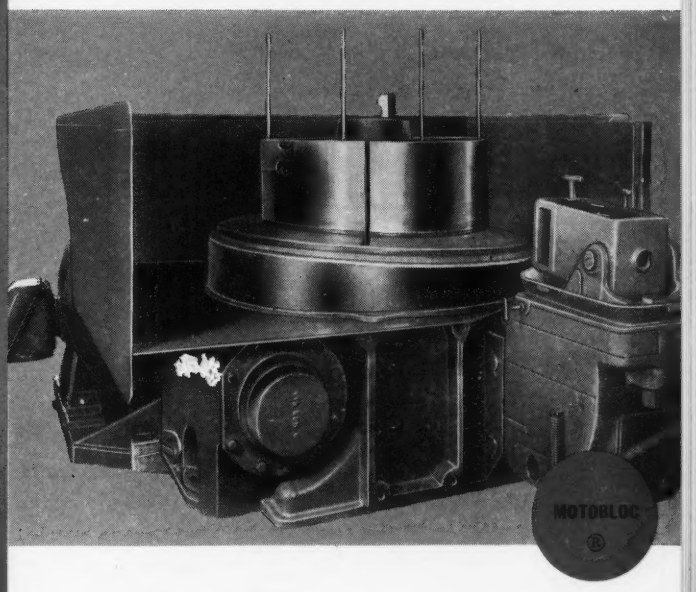




The Vaughn Machinery Co.

CUYAHOGA FALLS, OHIO, U.S.A.

COMPLETE COLD DRAWING EQUIPMENT . . . Continuous or Single Hole . . . for the Largest Bars and Tubes . . . for the Smallest Wire . . . Ferrous, Non-Ferrous Materials or their Alloys.



In the drive for greater wire tonnage

RELY ON

VAUGHN®

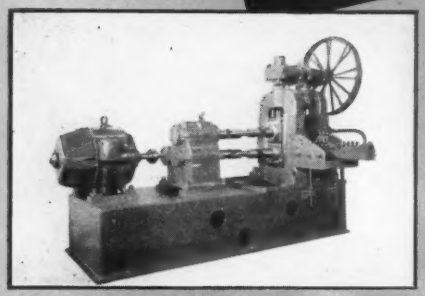
WIRE DRAWING MACHINERY

High machine and manpower efficiency, close-linked with dependable safety and flexibility, is the prime essential in meeting today's wire drawing demands. All Vaughn equipment—wherever installed today is satisfactorily meeting these requirements. Let us give you the facts.

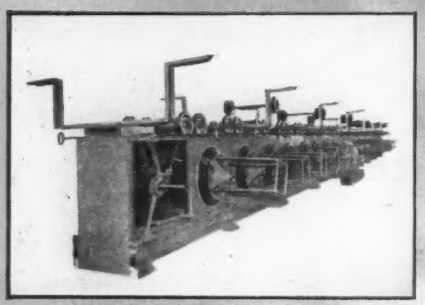
OFFICIAL PUBLICATION OF THE WIRE ASSOCIATION

LOOK TO Wean FOR WIRE MACHINERY

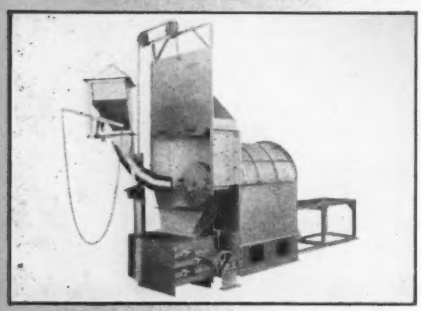
Process OR *Product*



2—Hi Wire Flattening Mill



Wire Galvanizing Take-Up Frame

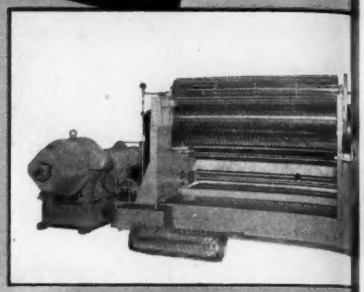


Nail Galvanizing Unit

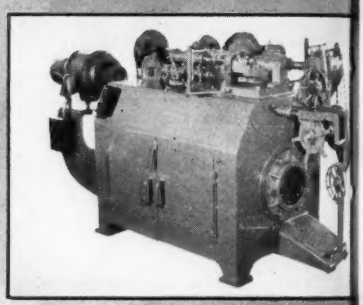
In the past few years tremendous progress has been experienced in the field of wire machinery. Production speeds have been tripled and quadrupled. Product quality has been greatly improved. Machines have been made easier to operate and maintain.

The Wean Equipment Corporation has been a large contributor to this advancement. Wean wire mill specialists have designed, built, and installed wire mill equipment for the leading wire producers the world over. If you make wire you should look to Wean for the best in machinery, service, and facilities.

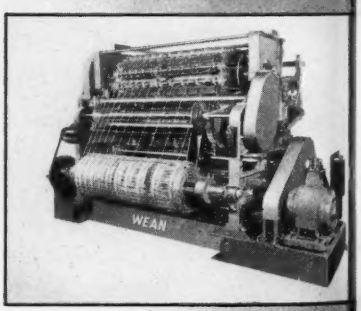
STRIP MACHINERY



Hexagon Netting Machine



2 or 4—Point Barbed Wire Machine



Hinge — Joint Fence Machine

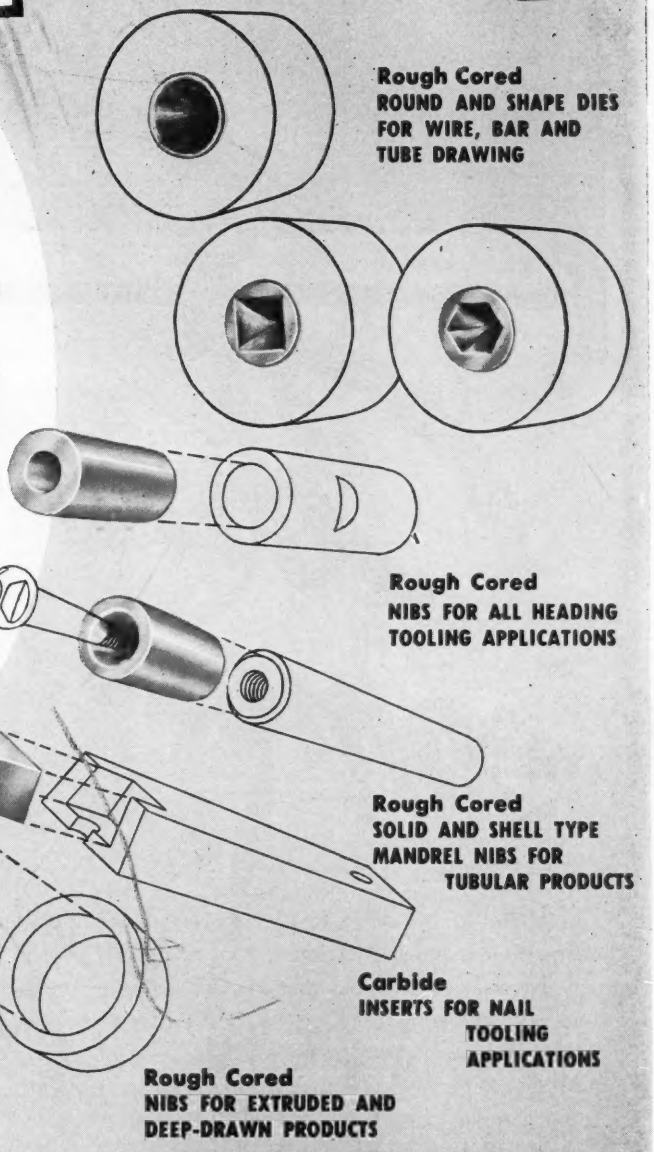
Wean *Equipment Corporation*
CLEVELAND, OHIO

Specify Firthaloy

FIRTHALOY Sintered Carbide is the standard of quality for drawing and forming operations. It assures maximum production, uniform size, excellent finish and economical operation. To do work better, faster, and cheaper . . . specify **FIRTHALOY** Sintered Carbide when ordering from your local tool and die maker.

Firth Sterling supplies standard wire, tube and bar dies in a rough cored condition in sizes up to R7. Dies R7 and larger are available both rough cored and rough drilled. In addition, **FIRTHALOY** Sintered Carbide is furnished in a wide variety of shapes and sizes . . . . another reason why leading tool and die makers have adopted Firth Sterling as a preferred source.

When you specify **FIRTHALOY**, you are assured of close co-operation between your tool and die maker and experienced Firth Sterling Service Engineers . . . "teamwork" that adds up to maximum performance and increased production.



Rough Cored
ROUND AND SHAPE DIES FOR WIRE, BAR AND TUBE DRAWING

Rough Cored
NIBS FOR ALL HEADING TOOLING APPLICATIONS

Rough Cored
SOLID AND SHELL TYPE MANDREL NIBS FOR TUBULAR PRODUCTS

Carbide
INSERTS FOR NAIL TOOLING APPLICATIONS

Rough Cored
NIBS FOR EXTRUDED AND DEEP-DRAWN PRODUCTS

Carbide
FOR SPRING FORMING TOOLS AND WEAR-RESISTANT PARTS

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R-263

Comfort comes naturally

Comfort, according to Webster, is "a state of contented enjoyment, of ease and satisfaction of body or mind, or both."

Manufacturers build that kind of comfort into their furniture and bedding when they specify Silver Star Spring Wire. There's nothing more relaxing, more restfully buoyant than steel springs, and Silver Star is special-analysis, high-carbon steel wire, engineered for this application alone.

Whether you make innerspring mattresses, industrial springs, kitchen gadgets, or some other product made from steel wire, chances are Bethlehem's modern wire mills can turn out the exact wire you need. Our engineers will be glad to help you solve any problems you may have in the selection and processing of steel wire.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

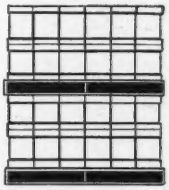
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

When you ship nails—ship safely in

INTERNATIONAL'S keg-it

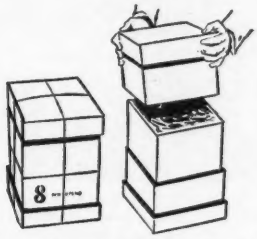
The square container tried, proved, and adopted by many of the largest nail manufacturers

This new modern fibreboard package for nails didn't come about by accident. Over three years of research and thousands of shipments proved it to be the safe, sturdy container with many economical advantages. We would like to tell you more about it, how easily it will fit into your operation. Write us for the complete story.



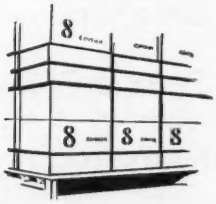
STACK IT

...Saves up to 30% of warehouse space. Readily palletized for unit load handling.



SEAL IT

...Replaceable top protects nails from dirt and weather.



STAMP IT

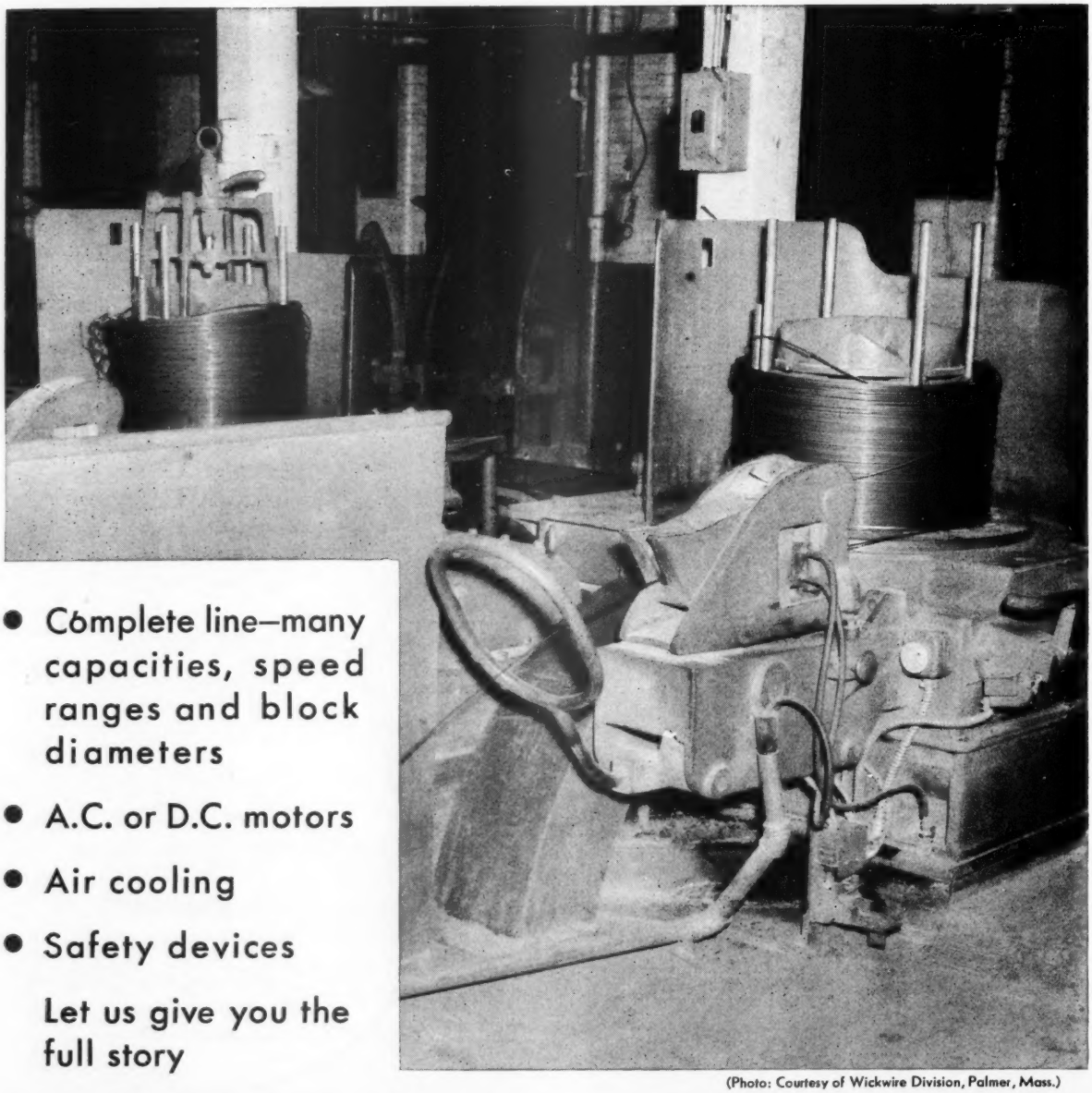
...Quick, easy side marking aids identification, speeds inventories.

International Paper company

CONTAINER DIVISION

220 East 42nd Street, New York 17, N. Y.

Quick facts about MORGAN WORCESTER WIRE BLOCKS



- Complete line—many capacities, speed ranges and block diameters
- A.C. or D.C. motors
- Air cooling
- Safety devices

Let us give you the full story

(Photo: Courtesy of Wickwire Division, Palmer, Mass.)

MORGAN-CONNOR
WIRE MACHINES

WM68

MORGAN CONSTRUCTION COMPANY • WORCESTER, MASSACHUSETTS

WIRE AND WIRE PRODUCTS

Reg. U. S. Pat. Off.

A monthly publication devoted to the production of Wire, Rod and Strip, Wire and Rod Products and Insulated Wire and Cable.

DRAWING — ROLLING — EXTRUDING — FORMING — FABRICATING

Vol. 27 SEPTEMBER, 1952 No. 9

Designated as Official Publication By The Wire Association

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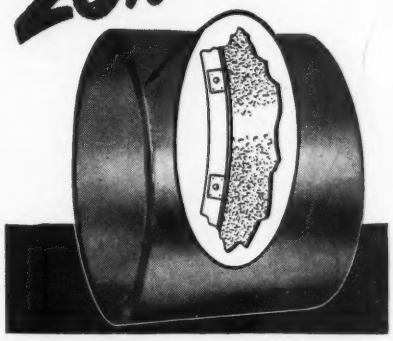
extra STRENGTH SERVICE and 20% LESS WEIGHT



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"Reinforced Type"

FLANGED STEEL TRAVERSES

for wire and cable

. . . have extra strength where it is needed most—at bolt holes and base of the flange. This reinforcing makes possible the use of lighter gauge steel, saving up to 20% in weight while increasing overall strength.

Niles Flanged Steel Traverses have given as much as sixteen years' service without refinishing or major maintenance, according to actual experience records. In many cases their use has doubled the number of trips per reel before cut downs or scrapping of wooden heads.

They are manufactured in sizes up to 56" diameter and 48" traverse —in plain, painted or hot dip galvanized finishes—as light as 18-gauge steel. Width of flange and number of bolt and drain holes are furnished to your specifications. Available for prompt delivery. Write for prices.

• • •

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NILES STEEL PRODUCTS DIVISION

REPUBLIC STEEL CORPORATION
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In selling wire drawing lubricants...

...in playing golf...

it's the FOLLOW THRU that counts!

Naturally, you want to buy a quality product. You're *assured* of highest quality with Steelskin wire drawing lubricants—famous for consistent quality that results in improved die life . . . lower costs . . . superior wire products. And with Steelskin, you're assured of FOLLOW THRU . . . that extra ingredient which makes Steelskin your best lubricant buy! Steelskin salesmen are trained to follow thru with extra service, trained to trouble-shoot on the job in the interests of better service to our customers!

Yes, in golf, or in buying wire drawing lubricants, FOLLOW THRU *is* important. You get it with Steelskin!

WRITE for information on Steelskin today.

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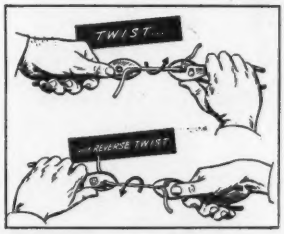
Company, Inc., Homer 1, N. Y.

CHASE® WIRE gets a "physical" to make your products better

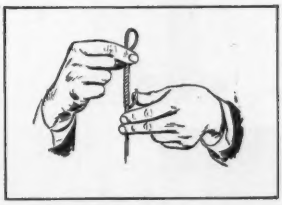
Chase wire is carefully inspected and tested to catch any defect.

In addition to the usual tensile strength tests, it is tested for slivers or any other physical or surface defect not possible to detect by visual inspection.

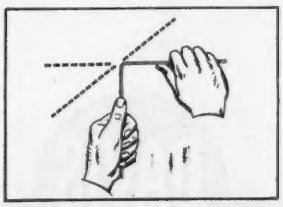
Because of the high ductility and malleability of Chase wire, it is superior for cold-heading, drawing, forming, shearing and many other operations. Chase brass wire is available in a wide range of color from copper red to golden color.



TEST NO. 1. Chase wire is twisted ten times in each direction to reveal seams, slivers, as well as other irregularities.



TEST NO. 2. Only wire of the very highest quality can pass this exacting 360 degree wrap-around test for forming.



TEST NO. 3. Chase wire is bent sharply at right angles in four different directions to reveal possible brittle condition.

Chase® BRASS & COPPER

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• *The Nation's Headquarters for Brass & Copper*

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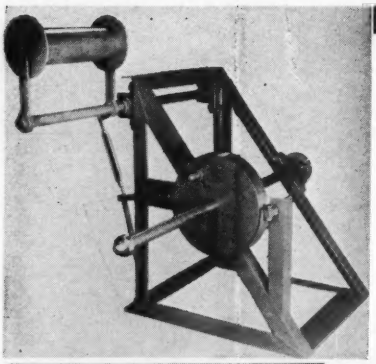
COMPLETELY AUTOMATIC SPARK TESTING EQUIPMENT FOR ELECTRIC WIRE AND CABLE



THE DAVIS PAY-OFF

The **DAVIS PAY-OFF** is of simple design and rugged construction. Tension and braking are controlled automatically, so that over-travel of wire is prevented. It will stop instantaneously when the wind-up spool stops.

Equipped with self-aligning ball bearing pillow blocks to reduce friction and prolong the life of the mechanism.

While designed primarily for use with **DAVIS SPARK TESTERS,** this versatile machine may be used in other operations in your mill where pay-offs are needed. Will give years of dependable service.

Pay-off stands are designed for right or left. Also in shaft sizes of 1¼" or 1½". Will accommodate reel sizes up to 30" in diameter and 16" wide.

ALL DAVIS ELECTRICAL EQUIPMENT MEETS UNDERWRITERS APPROVAL

THE No. 4 SPARK TESTER

This No. 4 unit and bead chain electrode combined with a Davis Pay-off stand, a Davis Take-up, and a predetermining counter, makes a complete Respooler and Resparker.

This complete unit will Spool Test wire up to 1200 feet per minute. It automatically shuts off when the reject is found by the sparker and also when the predetermined amount of wire has gone through the counter. Footage can be increased by lengthening the electrode. The unit can also be designed to produce constant footage. Listed below are the standard bead chain type electrodes and their capacity:

18"— 500 feet per minute—up to 1" wire size
24"— 800 feet per minute—up to 1" wire size
36"—1200 feet per minute—up to 1" wire size

This Davis spark tester is so thoroughly engineered, it will, if instructions are followed, detect 99% of all faults in the insulation.

This unit can also be obtained in voltages up to 30,000. Electrodes can also be obtained to accommodate up to 2" cable.

DAVIS SPARK TESTER OPERATES ON 110 VOLTAGE

220-440 MOTOR VOLTAGE ON ALL DAVIS EQUIPMENT —OTHER VOLTAGES MAY BE HAD TO MEET YOUR SPECIFICATIONS.

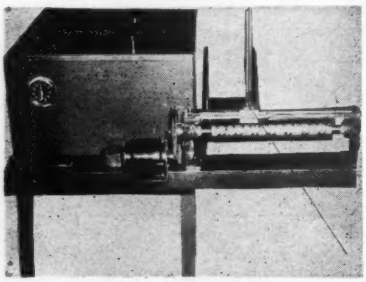
THE DAVIS PAY-OFF AND TAKE-UP IS BUILT FOR EITHER LEFT OR RIGHT HAND SHAFT.

COUNTER

The Davis predetermining counter is noted for its ease of setting and its accuracy. Mounted on its own pedestal, it can be easily moved for the convenience of the operation.

Wire size .010 to ½" also available in heavy duty model—wire capacity 3/16" - 1½" cable.

When used on a spark testing unit, its built-in switch immediately shuts off the power to your spool take-up or predetermined counter when any desired amount of wire has passed through it.



TAKE-UP

A versatile variable speed, constant tension, motor-driven mechanism that is electrically controlled.

Designed for use with the **DAVIS SPARKER,** it has nevertheless many other applications where fast and accurate lay-winding are desired.

This Take-up is equipped with an adjustable traverse that will accommodate reels up to 16 inches in width and 30 inches in diameter, with shaft sizes of 1¼" or 1½" in diameter.

The electrically controlled brake is completely automatic.

Your wire may be layer-wound by adjusting the spindle speed to correspond with that of the traverse. An automatic torque control starts the machine smoothly and slowly to prevent the breaking or stretching of wires.

The Davis Take-up unit is designed for adjustable speed ranges of 75 to 300 F.P.M. or 75 to 1200 F.P.M. A built-in tachometer indicates the speed.

TRAVERSE MOTOR 110 VOLTS—OTHER VOLTAGES MAY BE HAD TO MEET YOUR SPECIFICATIONS

DAVIS EQUIPMENT

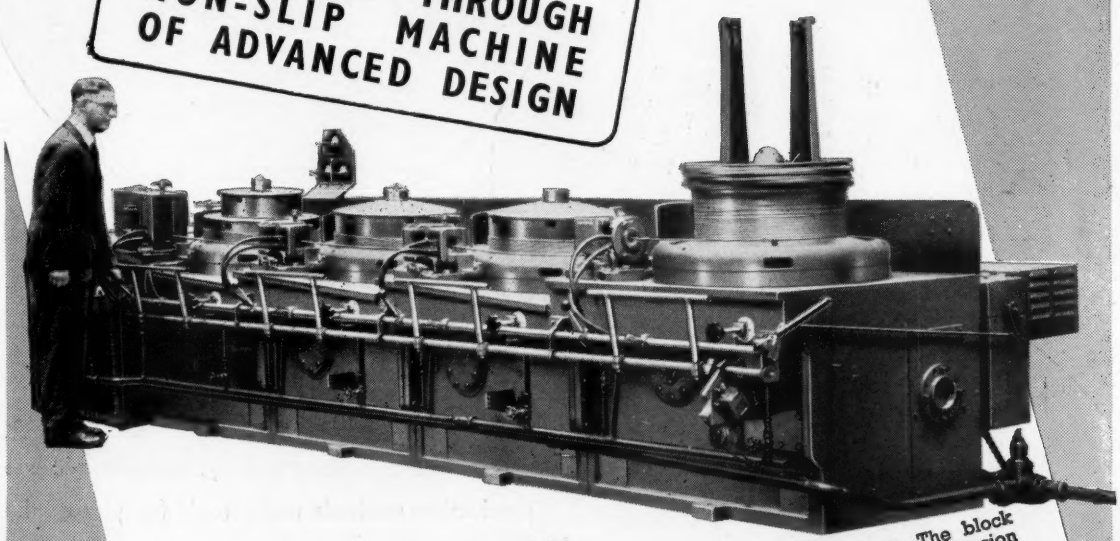
DAVIS ELECTRIC CO. WALLINGFORD, CONN., U.S.A.

HARNESS TESTERS • PAY-OFFS • TRAVERSES

SPARK TESTERS • SPOOLERS • TAKE-UPS • CAPSTANS

The PATHFINDER

A STRAIGHT THROUGH NON-SLIP MACHINE OF ADVANCED DESIGN



Special 4/5 Block Pathfinder Type 22/40 for drawing mild steel from 5 s.w.g. at speeds up to 2,250 feet per minute.

1. The wire passes straight through the machine from block to block. The block speeds are automatically regulated by our patented electrical gear. Wire tension between blocks can be independently set.
2. Tilted blocks enable sufficient wire to be accumulated on each block to allow for ample cooling and yet pass through the die to the bottom of the following block in a straight line.
3. Almost infinite drafting can be obtained at each die.
4. The machine is ideal for use with a heavy spooler carrying up to about two tons of finished wire.
5. Owing to the absence of all guide pulleys, multi-holing from very heavy inlets is perfectly feasible.
6. Standard SIX BLOCK machines are available for high carbon or mild steel as follows:—

	Type 22/30	Type 22/40
Block Diameter.	22"	22"
Maximum inlet.	.250"	.3125"
Finish.	.120"—.072"	.156"—.080"
Drawing Speeds Ft/Min.	800—1600	700—1400

MARSHALL RICHARDS MACHINE CO. INC.

1100 SOUTH BROAD STREET · TRENTON 10 · NEW JERSEY
Telephone: TRENTON 9478 · Telegrams: MARICH TRENTON

MR-52

NOTHING BUT REELS ARE MADE BY BRIDGE

Above: First step in forming reel heads

WOOD REELS
for
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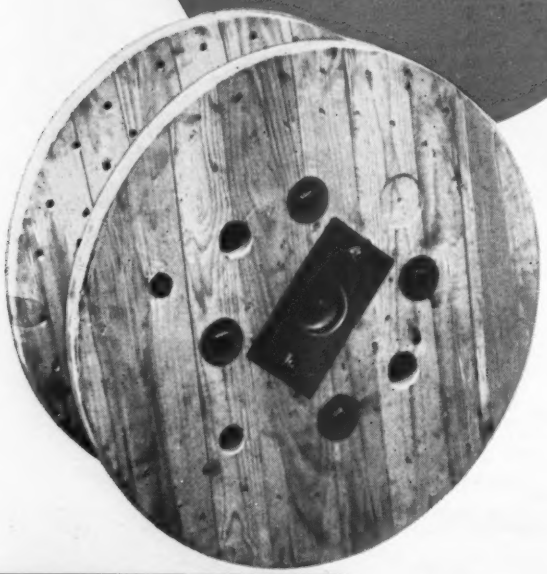
12" to 96" in diameter. Knocked down or assembled. Returnable or non-returnable. Reel heads for steel drums.



KEEP YOUR MILL SUPPLIED BY A REEL SPECIALIST

It will assure you of sturdy, strong, precision-made reels of highest quality. Our straight-line production methods make reels for you at the lowest possible cost.

Every operation is automatic, with specially designed tools and jigs that produce reels to your own specifications that you can depend upon for satisfactory service.

PLUS A SPEEDY SHIPPING SERVICE

Bridge delivers by truck to your door within a radius of 200 miles from the plant. Fast freight will bring you Bridge reels in 5 days or less east of the Mississippi.

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MANUFACTURING CO.
HAZARDVILLE, CONN.
Phone Thompsonville 3375

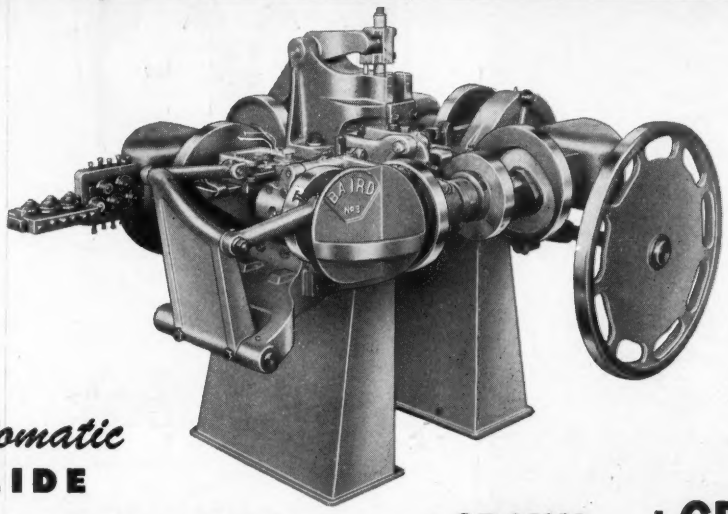
Let us quote on your reel needs. Send your specifications. Better yet, visit our plant and see how and why our reels are made so well at so low a cost.

ASK

BAIRD

ABOUT IT!

HIGH PRODUCTION TOOLING



BAIRD *Automatic*
FOUR SLIDE

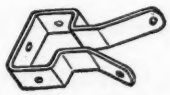
. . . the Machine that GROWS and GROWS and GROWS

Start, if you wish, with the standard (stocked) 4-slide, which in itself is remarkably versatile in forming hundreds of articles from wire and ribbon metal.

Then when conditions demand . . . a call for even greater versatility of production or a change in certain products . . . you may add one or more attachments to the standard model, so designed that "machine growth" is simplified and practical.

Thus, with gradual investments, you will build your Baird 4-slide to a full production unit capable of turning out the widest variety of wire and ribbon products. Here is a list of attachments easily added . . . but naturally, not all on one machine . . . as they might become too complicated.

1
Horizontal Press Attachments



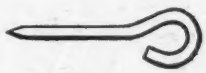
2
Form Raising Attachment

3
Pin Pulling Attachment

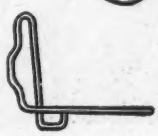
4
Round Wire and Ribbon Metal Rings
(Simple, practical tooling available)

5
Secondary Cut-Off Attachment

6
Pinch Pointing — Nail Pointing
(Tooling to suit work and wire specifications)



7
Vertical Forming and Stripping
(New patented Baird mechanism for this work)



Baird engineers will gladly develop tooling from your parts or specification. "Ask Baird about it!"

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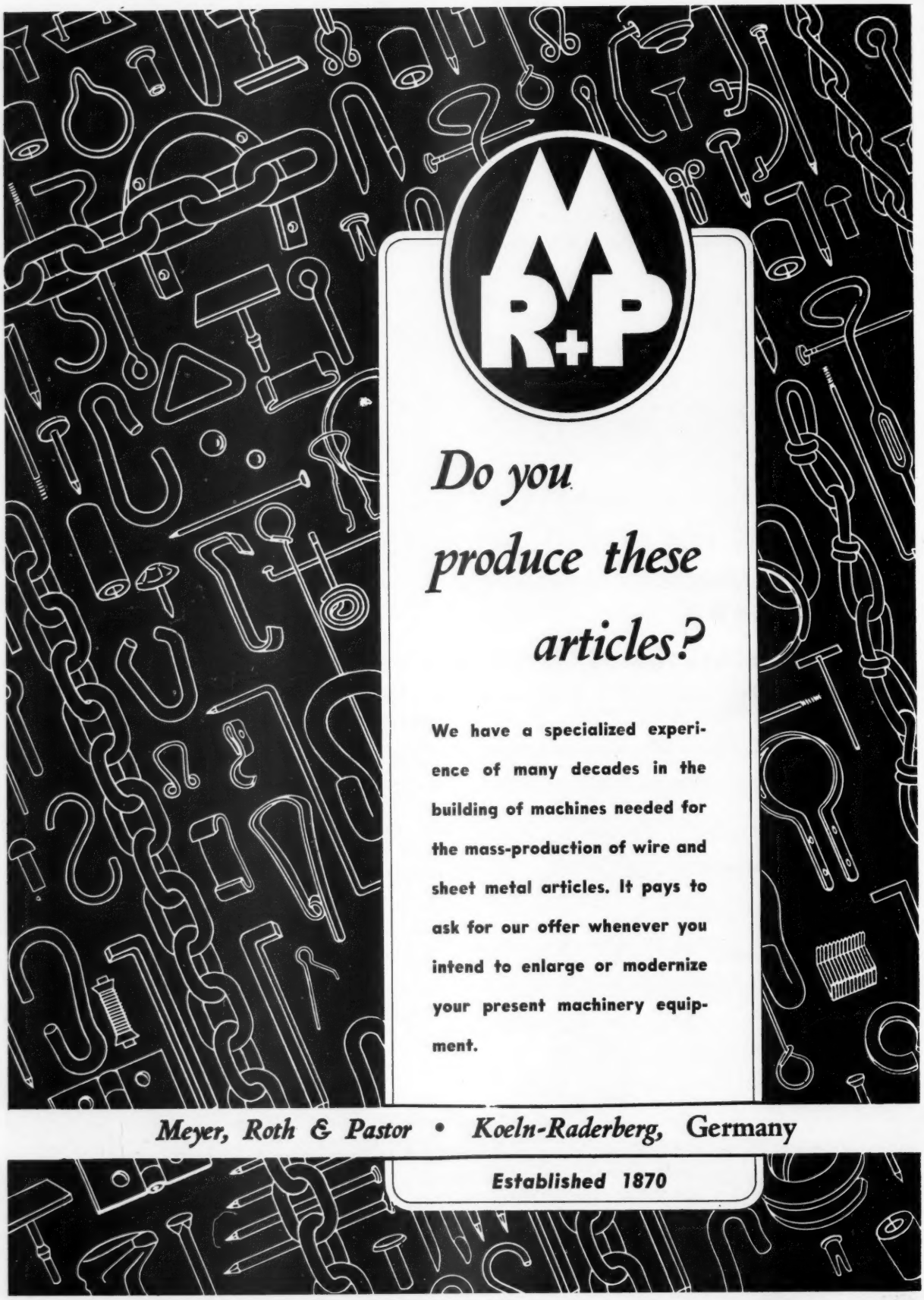
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OFFER GREATER TENSILE STRENGTH WITHOUT CHANGE IN BULK

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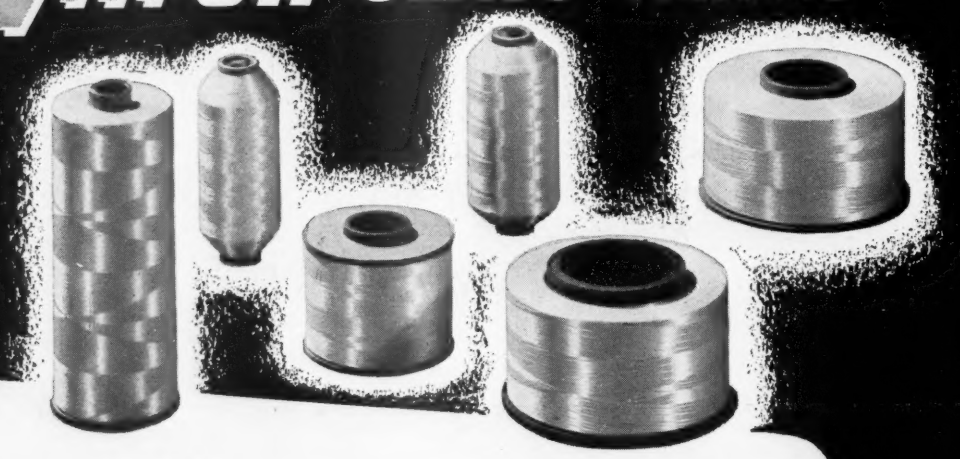
Low-Twist Vitron GLASS YARNS



Cut material, time and inventory costs

To meet a specific need of many manufacturers, Glass Fibers originated VITRON 300 glass yarn—a new strand size—in low-twist constructions. So rapidly are low-twist 300's becoming a standard of the industry, that Glass Fibers has also made available low-twist 450's and 225's as well, all in a complete range of constructions and packages.

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Reduces Inventory—since low-twist packages can be used for a wider range of jobs, fewer types are needed, reducing yarn inventories by as much as one-third.

Vitron® GLASS FIBER

ELECTRICAL INSULATING MATERIALS

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You can get it now! . . . and we believe it's the best spring steel we've ever made

OUR NEW specialty spring steel plant is in full swing. Equipped with today's most modern, precision machines, we believe we're producing flat spring steel that gives more for your money than ever before.

This new spring steel is tops in uniformity. It saves you preparation time . . . cuts down machine stoppages . . . gives you the greatest number of perfect parts from every foot and pound of steel.

With our greatly increased capacity we can make prompt deliveries on flat spring steel. And if you need high carbon round or shaped wire, ask what we can do. John A. Roebling's Sons Company, Trenton 2, N. J.

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Just call our nearest district sales office.

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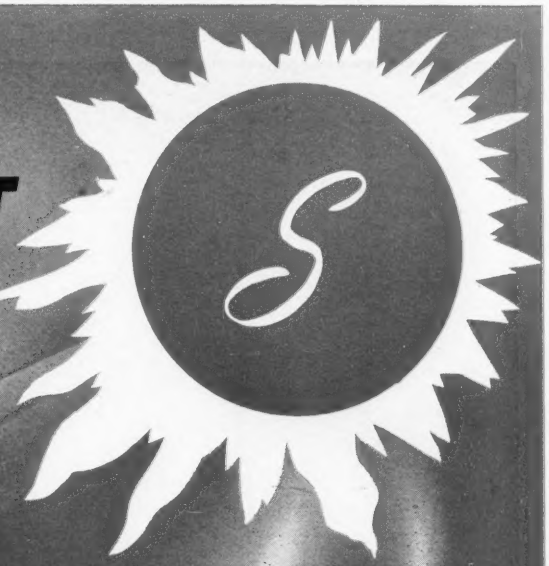
UNITED STATES STEEL

STAYS BRIGHT AS DAY! WITH



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Hexagonal Netting Machines

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Jaw Clutch Couplings
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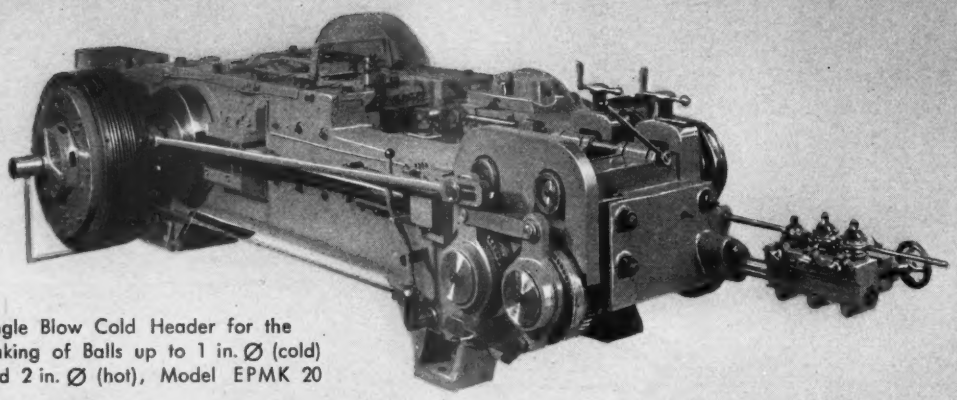

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knotting, forming —

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FOR COPPER WIRE . . .

A NEW PLATING PROCESS DESIGNED TO REPLACE HOT TINNING OF COPPER WIRE WITH ECONOMICAL, THINNER, UNIFORM COATINGS

Copper wire electrotinned by M & T process. Left: No. 14 wire burnished. Center: No. 18 wire burnished. Right: No. 18 wire plated with heavy coating of tin and redrawn to No. 30.

● Designed to replace hot tinning of copper wire, M & T's high speed alkaline electroplating process is more economical — permits coating closely to thicknesses in the neighborhood of 0.0002" — gets away from excessive use of tin on the wire — eliminates wasteful pot drosses and tin-copper alloying.

The process itself, utilizing the potassium stannate bath and "High Speed" anodes, involves only simple formulation — is easy to operate easy to control. Performance is good over a wide range of bath compositions, temperatures and current densities. High tolerance for impurities, such as those resulting from occasional faulty cleaning before plating, is a feature. The bath is non corrosive and will operate in any location without damage to surrounding equipment.

And, at speeds of 600 to 800 ft. per min. or more, the M & T process provides a pure tin deposit — adherent, fine grained and uniformed in thickness.

Investigate this process now. Write for information on advantages, procedure, and costs.

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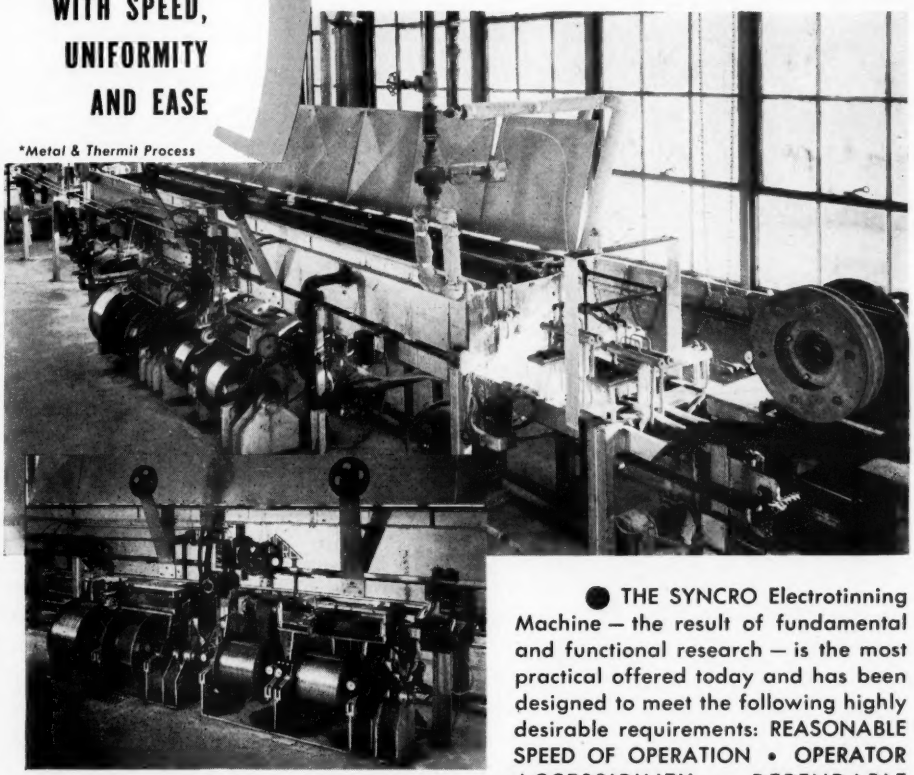
A NEW MACHINE ESPECIALLY DEVELOPED TO HANDLE THE PLATING PROCESS* OF COPPER WIRE TINNING WITH SPEED, UNIFORMITY AND EASE

*Metal & Thermit Process

Continuous • ELECTROTINNING

FOR COPPER WIRE . . .



View showing unit which can accommodate from 2 to 8 wire lines in operation for several months. Inset shows efficient handling equipment so arranged as to require a minimum of floor space. Note operator accessibility.

● THE SYNCRO Electrotinning Machine — the result of fundamental and functional research — is the most practical offered today and has been designed to meet the following highly desirable requirements: REASONABLE SPEED OF OPERATION • OPERATOR ACCESSIBILITY • DEPENDABLE STRAND CONTROL • MAXIMUM RANGE OF SPEED ADJUSTMENT • SIMPLE, EFFICIENT CURRENT APPLICATION • EFFECTIVE DRAG-OUT CONTROL • MINIMUM FLOOR SPACE • SENSIBLE COST. Write for further information on advantages such as the SELF-ADJUSTING INTERDRIVE allowing automatic spooling-tension of various size spools and variable take-up speeds; the perfection of the strand-handling equipment; and how the elimination of the following:—deflector damage; change gears; rubber tank linings; strand slackening; scrap losses and over-plating—puts this machine way ahead of conventional types.

SYNCRO MACHINE COMPANY

Better Machinery for the Wire Industry

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Affiliated Company:
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"Investigated all types, Bought Westinghouse"

...says Leading Tool Steel Producer

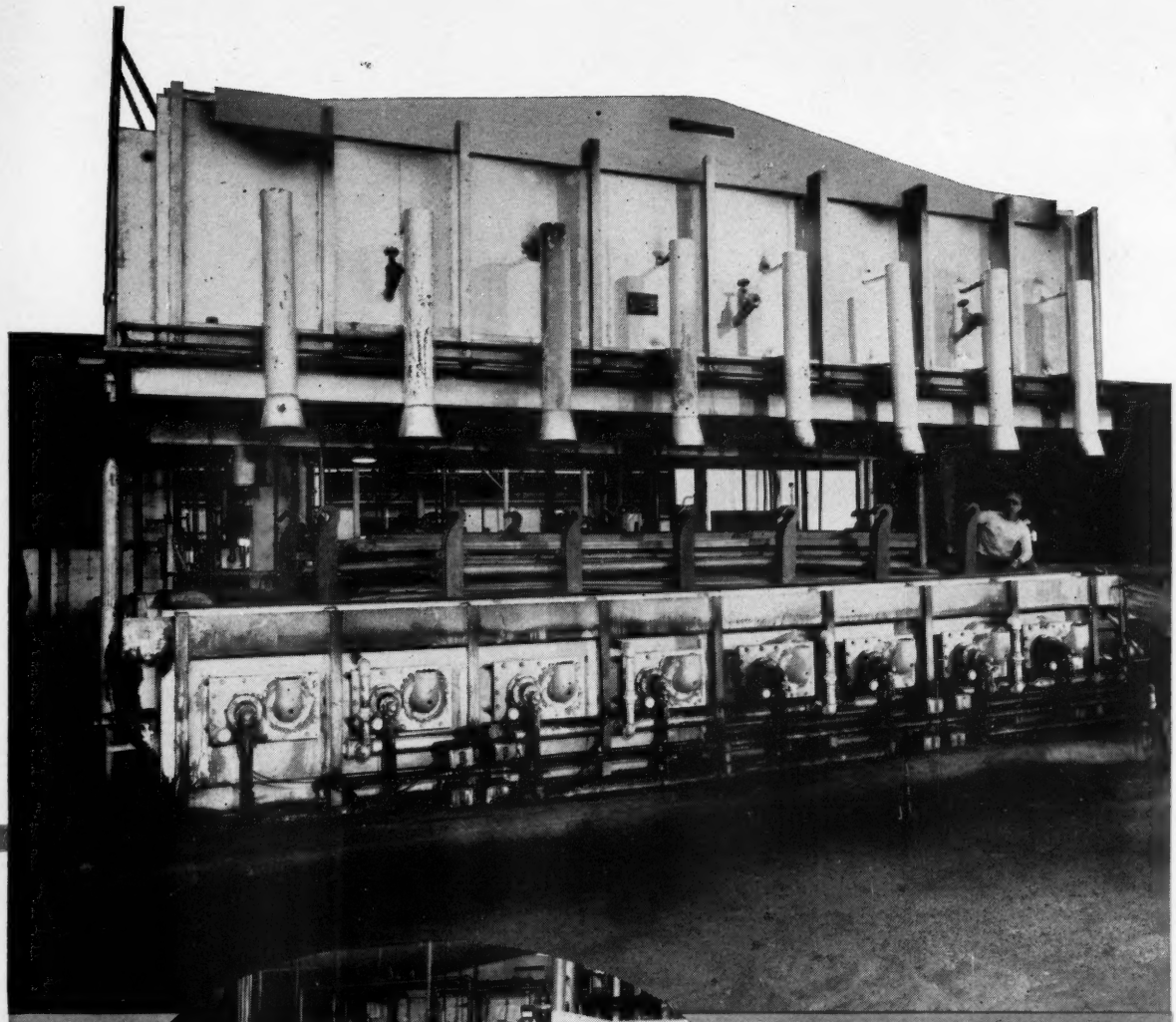
"Our Westinghouse gas-fired rectangular bell furnace has greatly increased our production of high-quality steel. It enables us to meet stringent customer decarburization specifications. Rejects have been virtually eliminated. Several costly production operations have been reduced or are entirely avoided"... reports this leading producer of tool and specialty steels.

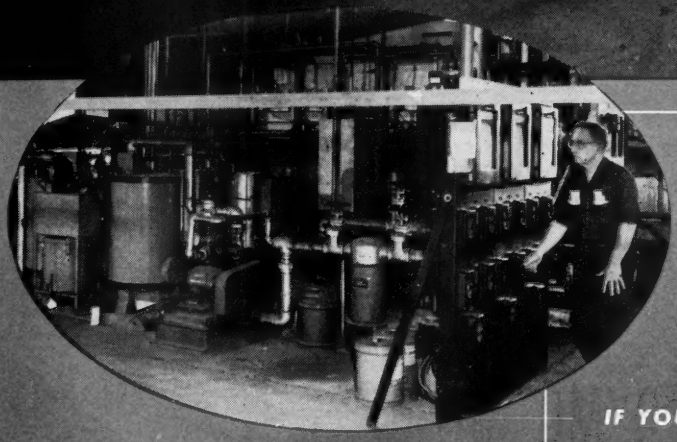
"We investigated all types before purchasing this furnace. In our opinion, Westinghouse was the best engineered, and offered the most atmospheric control on the market. To meet the demands for more production, we have just purchased another Westinghouse furnace."

Gas-fired or electric, there's a Westinghouse furnace to meet your heat-treating need. For toolroom application or continuous-line, high production, it's your assurance of an unbiased answer to your all-important problem. Get the facts from your Westinghouse representative. Write today for new 40-page book, B-5459, "Harnessing Heat." Westinghouse Electric Corporation, Industrial Heating Department, Meadville, Pa. J-10377

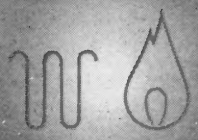
YOU CAN BE SURE...IF IT'S Westinghouse

HEAT-TREATING FURNACES

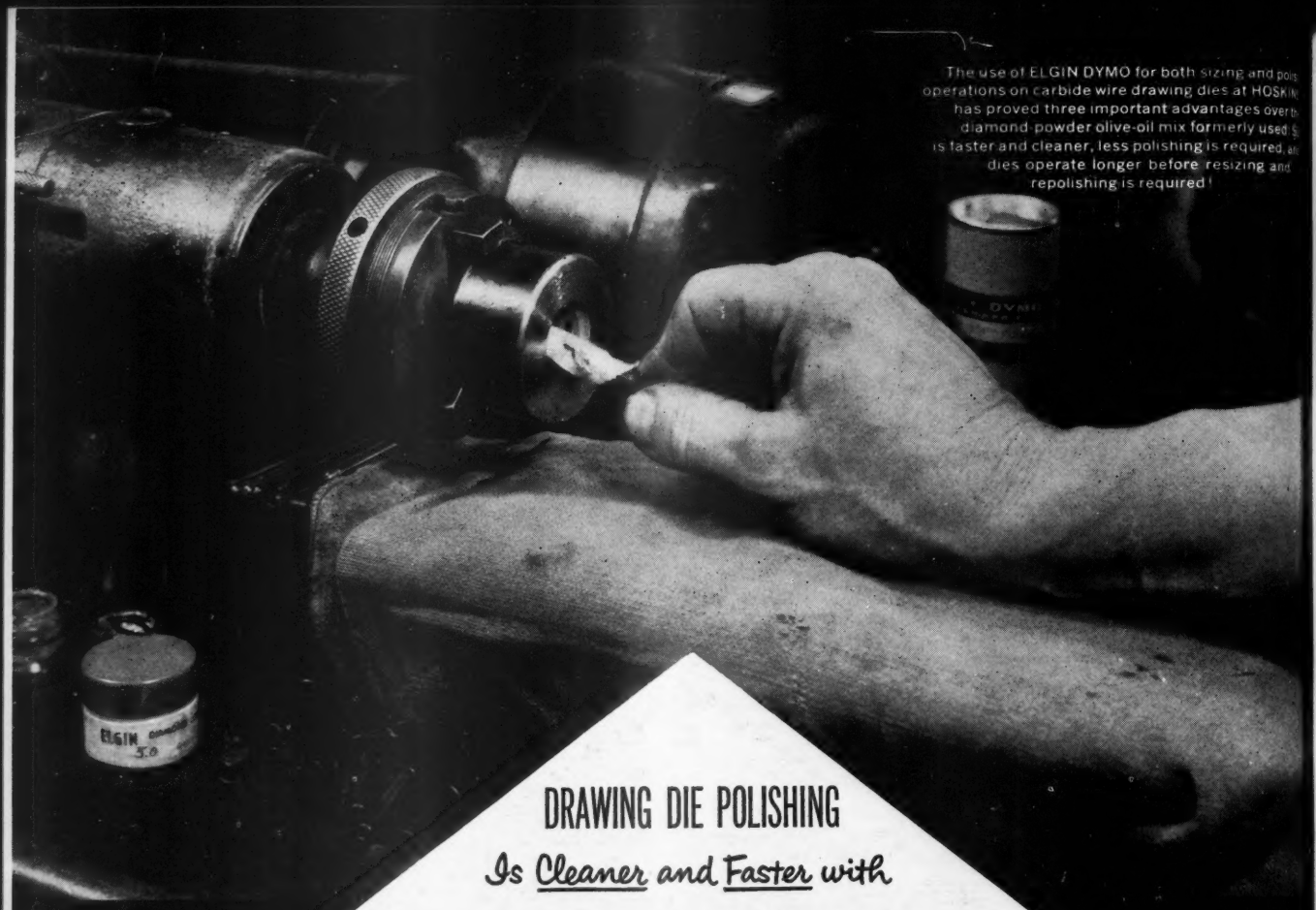




This three-zone heat control, used with the furnace above, produces more even annealing of bar stock, increases production, reduces unit cost.



IF YOUR PRODUCT CALLS FOR HEAT-TREATING...IT CALLS FOR A WESTINGHOUSE FURNACE ...GAS OR ELECTRIC


The use of ELGIN DYMO for both sizing and polis
operations on carbide wire drawing dies at HOSKIN
has proved three important advantages over th
diamond-powder olive-oil mix formerly used. S
is faster and cleaner, less polishing is required, an
dies operate longer before resizing and
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Is Cleaner and Faster with

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. . . at HOSKINS MANUFACTURING COMPANY

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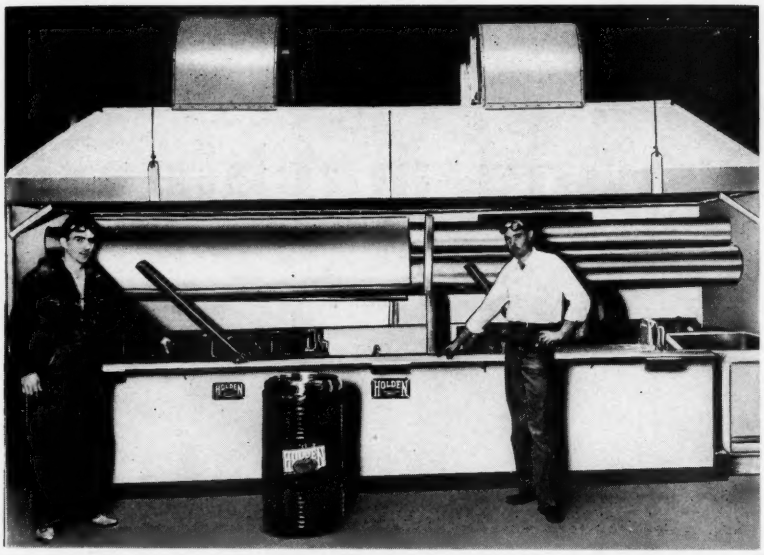
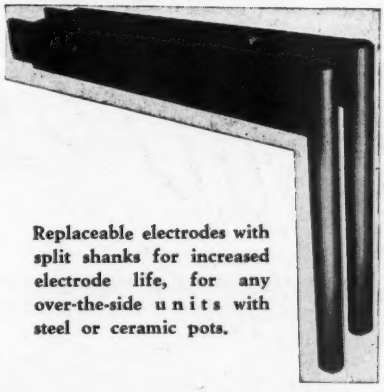
HOLDEN FURNACES AND SALT BATHS



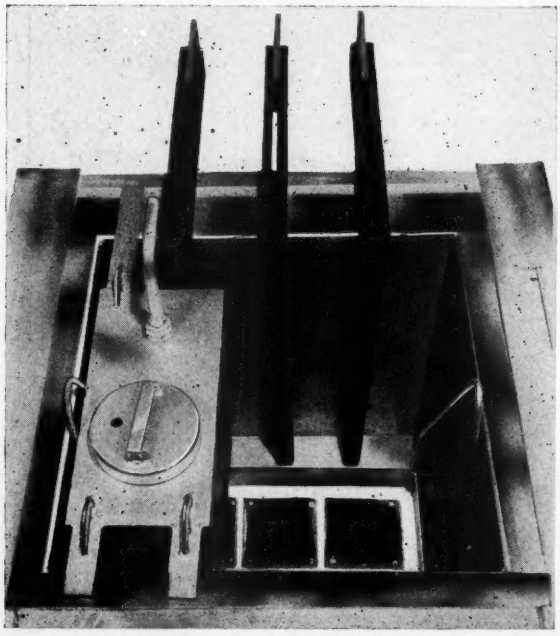
Strand Annealing Furnace for wire to produce bright finish.
For steel and alloy wires.
Process: Annealing or wire patenting.



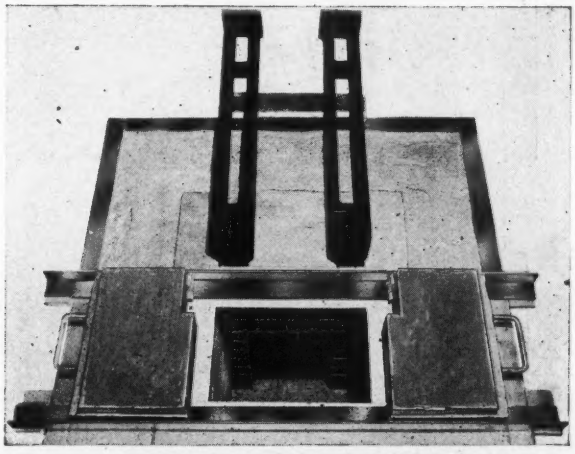
Replaceable electrodes with split shanks for increased electrode life, for any over-the-side units with steel or ceramic pots.

GUARANTEE:

HOLDEN Salt Baths are *guaranteed* in any type of furnace using steel, alloy or ceramic pots. We will assume manufacturer's guarantee in proven designs.



Small Sodium Hydride Furnace for experimental work on small wire coils—built in sizes from 36" by 36" by 36" to 20' long x 5' deep.



Submerged Electrode Furnace with replaceable electrodes. Built in sizes from 12' long x 8" wide x 28" deep to 20' long x 3' wide x 6' deep.

THE A. F. HOLDEN COMPANY

P. O. Box 1898
New Haven 8, Conn.

11300 Schaefer Highway
Detroit 27, Michigan

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"Always reliable!" . . . was the operator's remark about this wire-drawing machine which has continuously produced steel-wire for our customer every single working-day for 12 years.

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The Wire Outlook

Although the steel strike officially ended in July, the long, slow process of getting contract details with individual companies ironed out will still be going on for some weeks. Losses in steel production, variously, estimated at 14 to 19 million tons, may go even higher when the final tally is taken. In the wake of this are other strikes, principal of which concern our industry are those in the brass mills.

The practical result to the wire industry is that many integrated and non-integrated mills are scratching bottom and some, indeed, have had to shut down temporarily for lack of rods and wire. The automotive industry, steel's best customer, has also come to a virtual halt, eliminating a large demand for wire in various forms until cars are in full production once more. This industry's plight will be aggravated by the fact that the munitions program suffered seriously during the strike and the government set-asides for armament needs have been doubled.

It is estimated that labor lost $450,000,000 in wages, the government lost $210,000,000 in taxes and the companies $100,000,000 in profits. Why, then, did Murray hold out and Truman do nothing? It was an effort on the part of the one to extend the power of the unions over the men in the mills and on the part of the other to make a bid for votes. Both grossly disregarded the interests of individuals and the country. The labor unions, now in the saddle, are making many of the mistakes that management made when it was on top. It is not hard to believe that the unions will come a cropper for its errors, just as management did, in the not too distant future. What labor needs in its leaders is statemenship—not racketeering. Retail sales have been rising while factory output has been falling, so that high levels of business on the consumer end have been maintained. With the resumption of production, costs and prices will be up, although the adjustment to higher levels will be gradual. Some cost increases will be absorbed, to the disadvantage of profits, in the hope of holding markets. For the rest of the year, the election issues are expected to have no appreciable effect on business.

Aluminum settled with the unions and avoided a strike; the supply of this metal has improved to such extent that it is no longer in the "most critical" catagory. Copper supplies are also better, so much so that non-defense quotas have been raised. The outlook is for increasingly rising supplies of both these metals.

Manufacturers wire is now in short supply, although the demand for wire products has been consistently good. When rods and wire begin to flow freely, many redrawers and product fabricators will have to figure new price schedules, as the post-strike wire will carry the increases allowed by the Government.

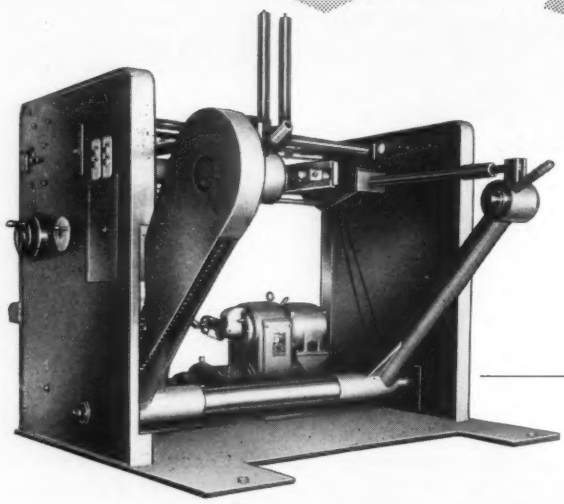
Perhaps more basic to the country's welfare right now is the matter of the next Administration. A continuation of the present party will mean a continuation of entrenched privilege. For a party that has built itself a strong machine to guarantee its perpetuation in office indefinitely, there can be but one answer—throw it out before it is too late. No matter how high-minded the candidate, he inherits a corrupt machine over which he can exert little power.

In November, therefore, it is up to an aroused electorate to install a new Chief Executive, who out of the wreck and ruin left by the outgoing administration, will start rebuilding America for Americans in keeping with American traditions of freedom. There is no North, South, East or West in the United States of America today. The coming election is not a matter of parties, but of principles. Every citizen who understands and loves his country, will order a house-cleaning.

—from the Editor's Desk

SHAFTLESS TAKE-UP

Eliminates the use of Reel Shafts



OUTSTANDING FEATURES

- Motor-driven reel lift with reel diameter indicator.
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Reel Width - - - - - - - - 48" Max.
Reel Weight - - - - - - - 16,000 lbs. Max

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DESCRIPTION

The frame is of heavy fabricated steel construction of sufficient rigidity for the specified load and/is mounted on a steel bed plate. The reel lift arms are of heavy steel tubular construction and are fulcrumed on a hollow steel sleeve. The reel pintles are mounted on anti-friction bearings and are moved into engagement with the reel arbor holes by means of a lever. Heavy roller-chain drive is fully guarded.

Reels are lifted by means of motor-driven screws. The reel-lift motor is controlled by an indicator-controller calibrated in reel diameter. The reel pintles lower automatically to the correct height when the indicator is set at a given reel diameter. Two sets of reel thimbles are furnished to fit reel arbor holes as specified.

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DRAWING — ROLLING — EXTRUDING — FORMING — FABRICATING

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The Increasing-Load Wire Abrasion Tester

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In this paper the author has described a method of testing the abrasion resistance of magnet wire coatings that has increased the accuracy and speed of testing and that provides the manufacturer an important control on the application of enamels to wire.

Abrasion resistance is probably the most important property of the insulation on an enamelled magnet wire. Wire enamel must have good abrasion resistance so that extremely careful handling is unnecessary during apparatus manufacturing processes, and so the insulation will retain its initial dielectric qualities in service. Hence, abrasion resistance is the most frequently measured property.

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Properly measured, abrasion resistance will evaluate the physical hardness and toughness of a new enamel. On established enamels already in production, abrasion resistance indicates whether or not the enamel is properly baked and so provides a most important manufacturing control test.

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It is in this field of specification and control testing that abrasion test devices find widest use. On the most widely used wire enamel, the vinyl acetal type (manufactured by General Electric under the trade name of Formex), control testing for abrasion resistance is common practice throughout the industry.

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Since about 1941, abrasion testing of vinyl acetal wire has been done principally with the General Electric Repeated Scrape Abrasion Tester, Cat. 5120403. (Fig. 1) Standard test methods based on this instrument have been established and specifications for the acceptance or rejection of wire have been written.

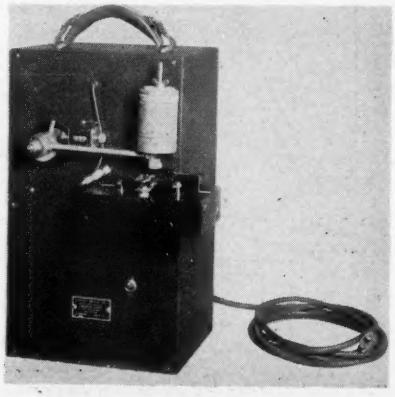

Fig. 1.—Repeated Scrape Abrasion Tester.

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During the ten years it has been in use, this instrument has provided the most generally accepted measure of abrasion resistance. However, it has been necessary to use the results with caution because of the wide range of values which it may give in tests made in different locations around the periphery of a wire and along its length. It has never been clearly established whether such variations are due to real variations in abrasion resistance or are inherent in the device. Indeed, since other devices also show variations to greater or lesser degrees, and there is no absolute or primary standard device, there is no way to prove conclusively how much variation is in the material and how much in the test device.

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The variability in results has not prevented the device from being extremely useful. It has meant that, to get accurate measurements a considerable number of tests must be made. In control testing a large volume of wire production, the fewer tests necessary to establish quality

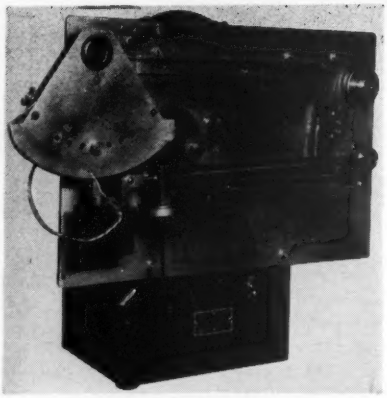

Fig. 2.—Increasing Load Wire Abrasion Tester.

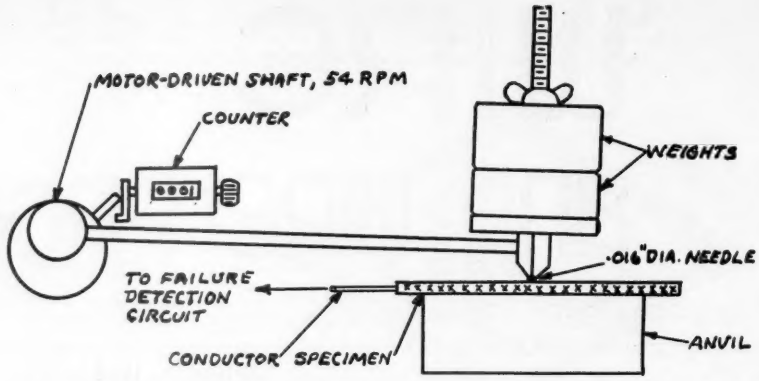

Fig. 3—Schematic View of Repeated Scrape Abrasion Tester. * * * * * *

the better, in order to keep pace with production.

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It has long been recognized that an abrasion tester giving less variable results would be desirable. For a number of years various alternative testers have been proposed and tried, none of which effected any important improvement. However, as a result of this long search a new abrasion tester has now been developed which gives the desired result. This is the Increasing-Load Wire Abrasion Tester (Fig. 2).

Principle of Operation

In the standard Repeated Scrape Abrasion Tester the wire insulation is abraded under constant load and the number of strokes to failure is taken as a measure of abrasion resistance (Fig. 3). Usually the wire is abraded in a number of planes about the periphery and the results averaged or the minimum observed.

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In the Increasing Load Tester, as its name implies, the wire is tested under a constantly increasing load The load at time of failure is taken as a measure of abrasion resistance. Again the test must be made in different planes about the wire in order to measure the effects of variations in film thickness and hardness. It has been found that this load-at-failure varies less from test to test than does the number of strokes-to-failure at constant load.

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A number of other ways of obtaining a constantly increasing load were considered before adopting the present one as the simplest practical means. In the tester shown in Fig. 2 and schematically in Fig. 4 the wire under test is clamped to an oscillating rocker and is rubbed by an abradant mounted on one end of of a counterbalanced pivoted lever. A load slider is moved outwards away from the pivot along the other arm of the lever in order to constantly increase the moment of the loaded slider about the pivot. The force exerted by the abradant on the wire at any time is equal to the load multiplied by this lever arm, and so this force also increases until the wire fails, whereupon the tester automatically stops. The load at failure is a measure of abrasion resistance.

Description

The prototype instrument shown in Fig. 2 has been built around a standard Repeated Scrape Abrasion Tester in order to utilize the driving motor and failure detection circuit of the standard tester.

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The novel features are all grouped on the metal panel attached to the front of the standard tester after removing that tester's wire-holding anvil, scraper arm and counter.

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The test specimen is clamped to the lower curved face of the pivoted rocker (at the left of the panel) which is caused to oscillate back and forth by the driving motor at the usual rate of 54 complete strokes per minute. The abradant is the same as in the standard tester, a #11 Sharps sewing needle (0.016" diameter) held in the usual clamp. The abradant is mounted at the left of a counterbalanced pivoted arm; to the right of the arm is a slider on which the usual slotted weights can be mounted.

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Behind the pivoted arm is a track on which runs a second slider. A closed-loop cord is attached to this slider and is guided by ball

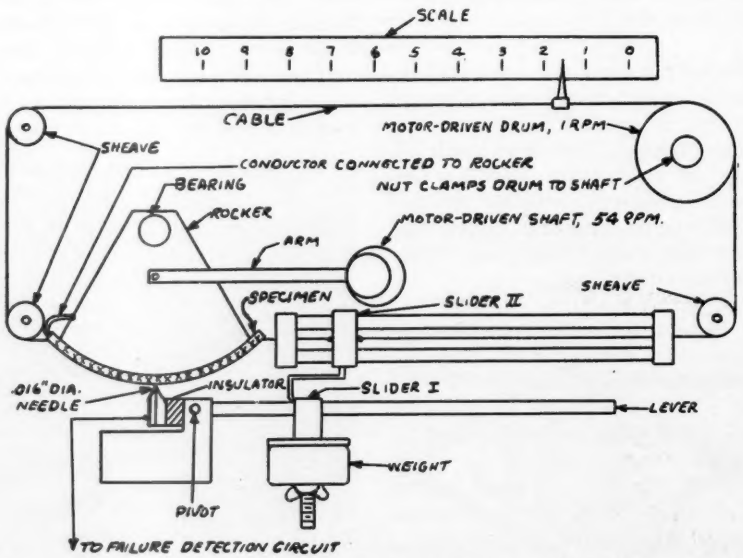

Fig. 4.—Schematic View of Increasing Load Wire Abrasion Tester. * * * * *

bearing sheaves to the drum shown in the upper right hand corner of the panel. This drum is rotated by a small permanent magnet A. C. Motor (speed—1 rpm) mounted behind the panel and energized only when the driving motor is. The switch on the panel shuts off the motors to prevent the slider from jamming against the end of its track. A projection on Slider II engages Slider I so that, as Slider II is pulled along its track by the cord, it moves Slider I to the right along the pivoted arm, thereby increasing the moment of Slider I plus the added weights about the pivot and hence increasing the force exerted by the abradant on the wire test specimen. When Slider I is in the position shown in Figure 2 the lever arm of the needle holding clamp and Slider I about the pivot are equal and the force exerted on the test specimen is the combined weight of Slider I and the added weights. The load at this and any subsequent time, then, is this combined weight times the distance traveled by Slider I from the pivot. A rider on the cord moves in front of the scale at the top of the panel and shows the distance traveled by Slider I. This scale is marked to permit direct reading of the load in grams for any position of Slider I when one of the two basic loads used to test all wire sizes is added to Slider I.

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The two sliders are used so that no appreciable forces in the vertical plane are exerted on the abradant by the action of moving Slider I along the pivoted arm. If the cord were attached directly to Slider I, its pull would have to be exerted always along a line parellel to the pivoted arm, or else a vertical component of force would be exerted acting about the pivot to produce variation in the force exerted by the abradant on the test wire. In the present arrangement the cord moves Slider II along a straight line and since there is a low friction contact between the sliders, only negligible vertical forces are exerted on Slider I regardless of whether the arm is exactly parallel to the Slider II track.

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The drum on which the end is wound can be revolved independently of its shaft by loosening a clamping nut. This permits quick and easy return of both sliders to the left end of their travel between tests. The drum diameter is such that the ratio of the lever arm of Slider I and its attached weights to the lever arm of the abradant increases from 1 to 1 to 5 to 1 while the specimen is abraded by 50 complete strokes (oscillations) of the rocker.

Table A

Operation

AWG Wire Sizes	Wt. of Slider 1-gms	Added Weight—gms	Total Base Load—gms
25-16	130	20	150
15-10	130	170	300

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The rocker on which the test specimen is mounted is adjustable vertically so that, regardless of wire size, the pivoted arm can be positioned approximately in a horizontal plane. Actually the optimum position for this rod is with its right end raised slightly so that Slider I is caused to remain in constant contact with Slider II by gravity. By shifting the pin which couples the connecting rod from the motor drive to the rocker from one hole to another in the series of 7 holes visible in the front of the rocker, 7 tests can be made at 1/2″ intervals along the wire. Each test abrades the wire in a path 3/8″ long as in the standard tester.

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Electrically, the test specimen conductor is grounded at the rocker and the abradant is connected to the failure detection circuit.

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To perform an abrasion test, a specimen of wire about a foot long is cut, stretched about 1% to remove knicks and twisted so as to successively present four sides of the wire to the abradant. This can be done without damage to the film. The insulation is removed for 1/2 inch at one end of the specimen. The wire is then clamped to the rocker.

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Weights are added to Slider I according to table A.

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Sliders I and II are positioned at the left of their travel and the tester started by turning on the panel switch and pushing the starting button. When the insulation has been abraded through, the tester stops automatically. The load at failure is read from the panel scale and recorded. The rocker is shifted to a new position and the test repeated until all four sides of the wire have been abraded. The average load at failure is taken as a measure of abrasion resistance, although the minimum of the four values also has some significance. Fig. 5 shows the tester in operation.

Test Data

A series of abrasion tests have been made with the prototype instrument of Fig. 2 to measure the improvement in uniformity of test results. Wires were tested on the Repeated Scrape Abrasion Tester and on the new instrument and the results compared statistically. Since standard practice in abrasion testing is to accept or reject a wire on the basis of whether or not it exceeds a specified minimum number of strokes-to-failure, the minimum value in a test becomes of considerable importance. It is usual, in analyzing results statistically, to determine a factor such as root-mean-squared deviation and use it in comparison. However, in this case, since a single minimum value is of such practical importance, a different and less common factor has been calculated for comparison purposes.

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(*Please turn to page* 928)

Fig. 5.—Increasing Load Wire Abrasion Tester in Use Checking Formex Wire in Wire Laboratory.

CHARACTERISTICS AND APPLICATIONS OF CAPPED AND RIMMED STEELS

by H. H. Smith
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American Steel and Wire Division
U. S. Steel Corporation
Cleveland, Ohio

This paper, delivered before a regional meeting of the American Iron and Steel Institute in New York City is published through the courtesy and by the kind permission of the Institute. In it, Mr. Smith has made a masterful presentation of a subject that concerns the great majority of steel wire drawers and product fabricators.

Introduction

It is perhaps not fully appreciated by those not directly connected with the steel wire industry that wire made from capped and rimmed types of steel covers a very large number of widely diversified applications, the development of which has been in process for years. Some of these contribute in no small measure to the comfort and conveniences of our everyday life as exemplified by such familiar household articles as insect screens for doors and windows, garment hangers, common pins, towel racks, egg beaters, carpet tacks, hinge pins, flour sieves, and many others too numerous to mention. Fabricators of bolts, nuts, screws and other cold headed products consume a surprisingly large tonnage of such steels in a large range of sizes and a variety of surface finishes and mechanical properties.

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It may be of interest to know that wire produced from these low carbon types of steel ranges in size from a few thousandths of an inch to better than one-half inch in diameter. It will be apparent that a discussion of the many products made from capped and rimmed steels is beyond the scope of this paper and only a brief description of a very few of the more important of these products is possible. For the same reason, a detailed description of the open hearth process used in the production of rimmed and capped steels is not feasible and only some pertinent comparative points will be mentioned.

Method of Production

Rimmed steel is produced by open hearth practices in which control of temperature and degree of oxidation in the furnace are important features because without such control proper rimming action in the ingot molds would not be secured nor would the desired quality be obtained. It has been found that the oxidation of the steel in the furnace increases as the carbon and manganese contents decrease and conversely with increasing carbon and manganese contents, oxidation of the steel has a tendency to decrease but the proper degree of oxidation in both cases can be successfully controlled for the required rimming action. When rimming steel is poured into the ingot mold, the outside portion of the ingot—or that part which comes in contact with the mold wall—receives a chilling effect which promotes solidification and subsequent formation of a skin. The ensuing result is a rapid generation and evolution of gases which continues during the formation of a thick wall of solidified metal adjacent to the mold wall and the stool on which the mold rests. During this period the steel "effervesces" and a rapid generation of gases takes place at or near the junction between solid and liquid metal. Also, while the outer portion, or "rim," of the ingot is solidifying, certain elements in the steel become concentrated in the still-liquid center portion or "core." The generated gases rise through the molten interior of the ingot, continuing the aforesaid effervescing or boiling effect at the top which causes this part of the ingot to remain in the molten condition. Thus, as the temperature of the ingot drops, a thick wall of solidified rim forms in its outer portion while the top of the core portion, being still molten, acts as a feeder, filling much of the central cavity which, under other conditions, would be formed in the top portion of the ingot because of shrinkage during solidification.

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Finally, when the top freezes, the central portion underneath is still in the molten condition and the continued evolution of gases results in the formation of blow holes which take up sufficient space to prohibit the formation of pipe. Under these conditions, rimmed steel is distinguished by a somewhat porous center commonly referred to as a core, which contains a higher concentration of certain elements, and a rim or case of purer dense metal much lower in carbon, manganese, etc.

Variable Cross Section

From the foregoing, it is apparent that rimmed steel is characterized by a core and rim, or core and case, the core being higher in carbon and other elements than the case area, which is relatively pure iron containing practically no carbon, etc. This core and case effect is made manifest quite strikingly by acid etching the cross section of the steel, either in the form of billet, rod, or wire. The procedure followed is to cut through a sample of the steel, smooth the cut face and etch in hot dilute hydrochloric acid. The center of core area, being higher in carbon and other elements, is more susceptible to the attack of the acid and

etches much darker than the rim or case area, resulting in a contrasting, well defined core and case pattern which is generally not found in killed steel. This pattern persists through the rolling processes to the final product. It is readily apparent, therefore, that the cross section of rimmed steel is not uniform in composition; instead it consists of a very soft outer rim, varying in thickness with the action obtained in the mold, and a center portion which is higher in the elements commonly found in steel and therefore considerably harder than the rim or case area. This condition might be regarded as two steels in one, since the composition in these two areas shows a decided difference. Generally the carbon content in the center of the core will be higher than that at the edge of the core.

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This is especially true of the top portion of the ingot, which is always higher in carbon, manganese, etc., than the bottom portion where the core and case effect is much less pronounced. In other words, the top of the ingot possesses a distinct and well defined core and case as brought out by the etching of the cross section, while toward the bottom of the ingot this decided pattern diminishes very markedly.

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It naturally follows that in rimmed steel there is a spread in analysis from outside to center of the ingot and also from top to bottom. It has been found, as a general rule, that the greater the rimming action or effervescence of the molten steel in the ingot mold, the greater will be the spread in analysis from top to bottom of the ingot. As a general rule steel which rims naturally contains not more than around 0.15 per cent carbon. It is possible to produce rimmed steel having a carbon content up to around 0.25 per cent; to promote the necessary rimming action in such steels, certain reagent additions to the molten steel in the mold are generally made. Rimmed steels are customarily poured into "big end down" square molds, although it is possible to produce such steels by pouring into bottle top molds. However in the latter case, the steel pourer has to "pour down" in the mold or, in simple terms, he does not fill the mold too full.

Capped Steel

Capped steel is produced in the open hearth in much the same manner as rimmed steel. However, capped steel is generally poured into bottle top molds and after the pouring operation is completed a heavy metal cap is fastened into the bottleneck of the mold. A concise description of capped steel is given in American Iron and Steel Institute Product Manuals under "types of steel"; this states in part, "The gas entrapped during solidification is in excess of that needed to counteract normal shrinkage, resulting in a tendency for the steel to rise in the mold. The capping operation limits the time of gas evolution and prevents the formation of an excessive number of gas voids within the ingot."

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In the production of capped steel, considerable skill is required on the part of the steel pourer, since for proper control it is necessary to pour the molten metal to the correct height in the ingot molds. Elapsed time between the end of pouring and the instant the mold metal comes in contact with the cap is also important. Steel which is capped too quickly will result in a skin or case of insufficient thickness and the surface of the steel, after subsequent heating and rolling, generally will not be satisfactory for the finishing operations; consequently the exacting requirements essential for successful performance of the steel in its end use will not be met.

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On the other hand, a delayed capping time will result in the production of steel which is practically full rimmed. The ideal capped steel will have a skin or case which is just thick enough to provide sufficient protection from possible damage to its surface in the soaking pits and in subsequent rolling operations. Such a steel will have a larger core area than rimmed steel and a small surrounding area of clean, pure, and dense case. It will also be somewhat more uniform in analysis from center to outside than is the case with rimmed steel and it will show less spread in analysis from top to bottom of the ingot. With these exceptions capped steels have characteristics which are to some extent similar to those of rimmed steels. It will be readily understood that the rimmed steel, because of its greater area of practically pure rim or case, is somewhat softer than capped steel.

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Both rimmed and capped steels, as previously indicated, are very widely used for a variety of products made from wire. For some uses they are used interchangeably and their advantages and disadvantages for specific applications are subjects of considerable controversy. As a consequence, the following dissertation, based on considerable experience, may not be in accord with some other opinions.

Welding Requirements

During recent years, the welding industry has made tremendous advances in the development of coated electrodes for electric welding. With these developments, the requirements of the electrode manufacturers have become increasingly stringent. The chemical composition ranges generally specified are of the order of 0.05 points of carbon and 0.20 points of manganese, with maximums of 0.025 and 0.035, respectively, for phosphorus and sulphur. The bulk of the steel required, which incidentally has reached considerable proportions, is made from rimmed or capped steel, ranging as high as 0.30 per cent carbon. With such narrow composition ranges as now specified, it is not possible to use the full product of an ingot for this application, and wire yields of less than 50 per cent from a given heat of steel are quite common.

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Selected open hearth furnace charges are necessary to comply with the restrictions required in chemical composition, and heats of steel which exceed the permissible phosphorus and sulphur maximums cannot be applied against orders for welding wire. Perhaps a brief review of the procedures developed to comply with welding wire requirements might be of general interest.

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If the ladle analysis seems satisfactory, adequate discard is obtained from each ingot to assure freedom from excessive segregation, after

which the identity of each billet rolled from each and every ingot is maintained. The billets from top to bottom of several marker ingots representative of the heat are selected for analyses. If the top billet is too high in chemical composition for the specification, the second or third billet is analyzed. At the same time the bottom billet is check analyzed and by a process of elimination, that portion of the marker ingots complying with the required composition is selected and this selection applies to the remainder of the heat. It is, therefore, apparent that a great deal of time is consumed in producing only that portion of welding wire heats which meets the required analyses specification. Sometimes, only the top part of the heat falls within the required composition specification and at other times, on the basis of check analyses, the bottom part only is satisfactory for application.

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As stated previously, the spread of composition from top to bottom of the ingot is greater in rimmed steel than that which generally prevails in capped steel. It follows, therefore, that a smaller portion of a rimmed heat of steel will re-check within a given specification than is the case in capped steel.

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Some electrode manufacturers have stated a preference for rimmed steel while others apparently find no appreciable difference in welding characteristics between rimmed and capped steel. It has been found, however, that sulphur over the specified 0.035 per cent maximum is very detrimental to the satisfactory performance of the electrodes. In fact, the preference is for sulphur contents well under 0.035.

Top of Ingot in Question

Some of the electrode manufacturers have indicated that electrodes produced from wire representing the top portion of ingots are inferior in welding characteristics, while electrodes made from wire representing the bottom portion of ingots are much more satisfactory. This may be largely due to the fact that top portions of the ingots are higher in sulphur (as well as other elements) than the bottom portions. Thus, the tops may be as high in sulphur as the permissible 0.035 per cent while the lower portions will be considerably less. It would seem, therefore, that the heart of the ingot would be best suited for welding electrodes; however, the portion applied against orders is that which rechecks within the required composition, which may be the top of some heats and the bottom of others. It is to be hoped that an electrode coating will be developed which will offset some of these effects in the steel wire used for this application.

Cold Headed Products

In recent years the rapid development of cold headed or cold forged products such as bolts, nuts and screws is due in no small measure to the progress of the steel manufacturers in improving methods of control during all stages of manufacture of steel wire for such material. Many of these cold headed products are made from rimmed or capped steel and new applications are constantly being devised, some of which call for extremely severe deformation. As a matter of fact, during recent years, fabricators have increased deformations in cold headed products to a surprising extent and the fact that high yields of satisfactory product have been maintained in their plants bears tribute to the improved methods of control devised by the steel wire producers.

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One of the prime requisites for wire applied to such products is a clean, sound surface, free from injurious defects such as seams, slivers, etc. Rimmed and capped steels with appropriate surface preparation in the billet stage and due care and control in rolling the rods provide such a surface.

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In the hot rolling processes, the core area of these steels is subject unavoidably to distortion and this condition is more severe in rimmed than in capped steels because of the greater difference of core to case relationship. This greater core distortion of rimmed steels calls for greater care in the correct setting up of cold heading machines because of the tendency of the core to buckle on the first blow of the header, resulting in uneven flow of the steel in the finishing blow. This effect gives rise to the danger of deheading of the cold upset product, especially where the amount of upset is severe. Capped steel, on the other hand, has a smaller area of case and is more uniform throughout its cross section. Thus, it is less susceptible to this condition.

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The threaded portion of a bolt gives further food for thought in comparing rimmed and capped steels, because the greater case area of the former might well be expected to give rise to weaker threads than would be obtained by using capped steel. Also, by virtue of its greater cross section uniformity and smaller rim area, capped steels generally provide a cleaner cutoff, with less drag than is the case with rimmed steels. However, rimmed steel has definite advantages, particularly for cold headed applications calling for excessively severe deformations. In such cases the greater area of soft rim or case is of considerable benefit in providing the required amount of increased flow of metal required for such severe cold work.

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Some heading steels call for sulphur additions to the steel to facilitate thread cutting and such steels are generally rimmed to obtain the sound surface necessary for upsetting. These steels tend to be sluggish in the molds, a condition which, if not remedied, would tend to result in poor rolling and subsequent undesirable surface. Riming reagents, therefore, are usually added in the ingot molds to provide the necessary action. This procedure, due to the nature of the steel, will provide somewhat less rim than is to be found in a regular full rimmed steel having no added sulphur. Sufficient rim is obtained, however, to improve rolling properties and furnish the surface which is essential to the satisfactory performance of the wire in its end use.

Wire Manufacture

Wire made from rimmed and capped steel is used in large amounts by chain manufacturers mainly because of the ease with which such

wire is butt welded after the chain links are formed. Uniformity of temper in wire for this application is highly important in order that spaces between the ends of the formed links will not show excessive differences, which would result in nonuniform welds from link to link. While rimmed steel for chain products would tend to provide easier formation of links due to its greater area of soft case, capped steel will furnish somewhat more uniformity throughout a heat due to its lesser spread in composition from top to bottom of the ingot.

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Low carbon wire is used for the manufacture of the familiar automobile tire skid chains. The cross chains of this product are case hardened and for this purpose wire made from capped steel is preferable. In the case hardening process, carburizing of the finished cross chain is an established custom and if rimmed steel were used the finished product would include three distinctly different composition zones throughout the cross section. Around the periphery of the links a higher carbon area would exist, followed by the remainder of the soft carbon-free rim area while, lastly, the regular core area would prevail in the center. More uniformity is obviously obtainable with capped steel having a thin case or rim.

Electro-Plating

Very high quality surface is of prime importance for wire applications involving electro-plating and for this purpose there is a distinct preference for rimmed steel. While such wire is produced by varying the lubrication and drafting in the wire mill to obtain the necessary clean, smooth bright surface, the thick dense case usually associated with rimmed steel aids materially in producing the desired surface finish. The requirements for plating are so stringent that the smallest visible surface pits are objectionable since they still persist after the plating operation.

Conclusion

The foregoing constitutes an attempt to describe very briefly the pertinent characteristics of rimmed and capped steels and to present a sketchy picture of two or three of their most important applications. The uses of such steels are almost endless and certainly outside the scope of a brief paper such as this one. It is certain, however, that the usefulness and advantages of these steels will result in the development of additional applications in the future.

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●

written by Kenneth B. Lewis, as only he can write. This remarkable book treats of the various operations in wire making, giving the history and theories underlying each process, tracing the development of machinery, equipment and supplies used in the industry, and naming those individuals and companies involved in the evolution of our industry to its present stage of development. A highly readable treatise. You'll like it!

The book, sponsored by the Wire Association, is an unusual contribution to the literature on the art of making wire. It is not a handbook nor reference work, but is one that will bear much reading, re-reading and study. Any wire man will be better equipped for his work through a knowledge of the contents of Mr. Lewis' book.

The edition is limited and orders can be filled only as long as the small supply lasts.

THE PRICE: $15.00

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Send your order today to assure yourself of a copy.

BOOK DEPT., THE WIRE ASSOCIATION

453 Main Street

Stamford **Conn.**

COPPERWELD FINE WIRE

by F. E. Leib, Chief Electrical Engineer
Copperweld Steel Company
Glassport, Pa.

While Copperweld wire has earned a substantial place for itself, both as a conductor and for product applications requiring strength and corrosion resistance, attention has lately been focused upon it as a fine wire conductor in view of the shortage of copper. The properties of this wire for such purposes are set forth by Mr. Leib in this article.

Copperweld wire, widely used in larger sizes on overhead electric power and communication lines for over 35 years, is now available in the finer sizes for the manufacture of various insulated wires and the forming of electro-mechanical parts. Rapid developments in Copperweld fine wire have taken place in recent months, accentuated by a universal and continuing necessity for saving copper.

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Recent experiments and studies show that practical applications for copper-covered steel wire in the electrical, electronic, communication, aircraft and automotive industries can save approximately 50 million pounds of copper annually. This is possible by using Copperweld in place of copper where the copper wires ordinarily are larger than need be for electrical requirements, but where smaller copper wires are not feasible because they lack adequate strength.

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Those who have used Copperweld wire know that it is a copper-covered steel wire in which the heavy covering of copper (30% to 40% by weight) is actually welded to the steel core. Copperweld is not a plated wire. In manufacturing this wire, a bimetallic billet is cast in which the copper is molten-welded to the steel and then hot rolled and cold drawn into wire just as if it were rod or wire of a single material. Base sizes of annealed Copperweld wire now are being drawn to fine wire, stranded, tinned and insulated by many copper wire mills.

Fig. 1.—Molten copper being poured around a heated steel billet in the mold. The two metals interlock to form the molten-welded Copperweld ingot.

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Copperweld weighs eight percent less than copper and is priced competitively with copper. Soldered joints and other electrical connections can be made as easily with Copperweld wire as with copper. At radio frequencies the electrical properties of Copperweld are equivalent to solid copper wire of the same diameter.

Types of Copperweld Wire

Copperweld fine wire is available in two conductivities, 40% LC and 30% HM, and in two tempers, annealed (soft) and hard drawn.

★ ★ ★

For applications where the wire must be bent and formed in service, such as pigtails for radio components, the annealed (or soft) wire is usually preferred. In these cases, the 40% LC is especially desirable, since it has a special soft steel core which gives it a pliability approaching that of copper, with about twice the strength. Generally, 40% LC can be used in place of copper with little or no change in forming dies or procedures. The 30% HM annealed is used where a somewhat additional degree of strength and resistance to breakage are desired and where the slight added stiffness is not objectionable.

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Certain applications such as wire antennas, coaxial cables and special leads and cords require a maximum of strength with less regard for pliability. For these, the hard drawn wire is recommended. Here, the 30% HM is widely used because of its higher strength.

Copperweld Advantages
High Conductance

At high frequencies either 30% or 40% Copperweld wire has the same conductance as copper and both 30% and 40% are applicable for most radio applications. At power frequencies or direct current the conductance is 30% or 40% of that of a copper wire of the same size. For the best copper economy the Copperweld wire should have only enough copper to carry the current, allowing the steel reinforcing to furnish the strength. Where heat transfer is a consideration, the 40% conductivity wire more closely approaches copper.

Good Reactance

Generally speaking, the reactance of Copperweld wire is the same as that of copper, even at relatively

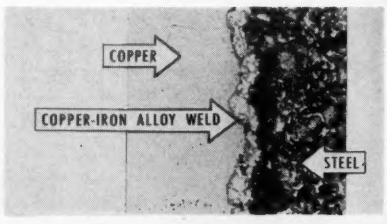

Fig. 2.—This photomicrograph of the Molten-Weld shows how the grains of copper and steel interlock to form a permanent, continuous we'd. No other process achieves this inseparable union.

low frequencies. Most of the current flows in the copper, therefore the steel core adds little to the inductance.

Greater Strength

Strength is one of the primary advantages of Copperweld wire. Copperweld annealed wire has a tensile strength in the order of 60,000 pounds per square inch, approximately double the strength of annealed copper. This added strength can be utilized to provide greater resistance to bending, breakage, or fatigue. Also, it may be adapted to reduce costs through use of a smaller diameter Copperweld wire to do the work of a larger copper wire where the size of the latter is determined mainly by mechanical considerations.

★ ★ ★

Almost all electronic wire parts have important mechanical requirements and individual analysis and trial will show where these can be better met with Copperweld wire.

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Where hard drawn wire is acceptable from a flexibility and pliability standpoint, tensile strengths well above 100,000 pounds per square inch are feasible with Copperweld. For special applications, tensiles approaching 200,000 pounds per square inch have been produced and can be considered where full details are available.

Ample Pliability

Copperweld annealed wire is quite pliable and can be formed and bent with ease. The uniformity with which Copperweld wire resists breakage under repeated bends is an important characteristic in many applications. Hard drawn Copperweld wire is much less pliable than annealed, but it should not be confused with stiff high carbon steel wires since its steel core is especially selected to avoid springiness.

Less Weight

Copperweld wire is approximately 8% lighter in weight than copper wire of the same diameter. This is, of course, due to the steel being lighter than copper—consequently, Copperweld contributes to possible economies where size-for-size substitutions are made.

Typical Applications
Radio and TV Hook-Up Wire

Copperweld hook-up wire is now standard with many radio and television set manufacturers. It may be formed and soldered the same as copper and is available in solid and stranded conductors with any of the usual types of insulation. The higher strength permits the use of smaller sizes and eliminates wire breakage during assembly.

Pigtails for Electronic Components

Copperweld wire is being used by many companies for pigtails on radio and TV resistors and condensers. Here it offers a high strength, yet pliable copper-type wire. Copperweld wire is available bare or tinned and in sizes 18 Awg to 26 Awg for pigtail purposes. It will better resist breakage from bending or vibration—and is easily handled and formed.

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Often, a smaller gauge of Copperweld wire can be applied, as compared to larger gauge copper pigtails needed for mechanical reasons.

Electronic Tube Parts

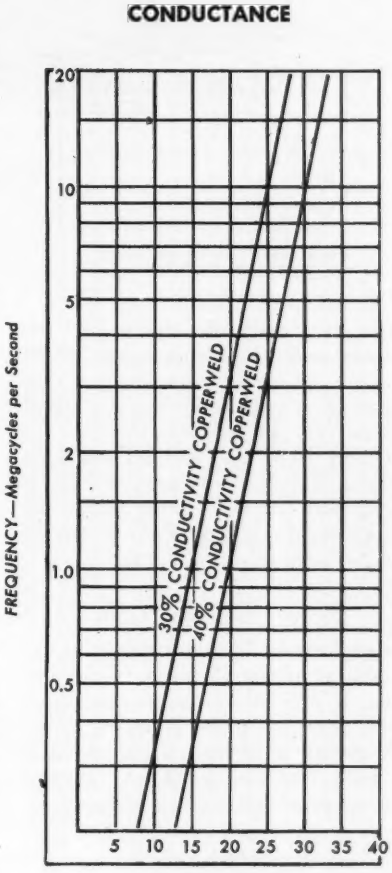
Strength, ductility, heat transmission as well as good mechanical and electrical properties at high temperatures are among the advantages of Copperweld wire for radio tube parts. Because of these features, it is widely used as grid side rod wire where it can be cut and formed in a manner similar to bronze wire. Copperweld wire is also utilized for connecting leads from base to glass seal wire.

Lamp Components

Connections from lamp base to glass seal wire are being economically made with Copperweld by manufacturers of both incandescent and fluorescent lamps. Copperweld provides a copper-type lead of adequate conductance, together with good strength, soldering and welding properties.

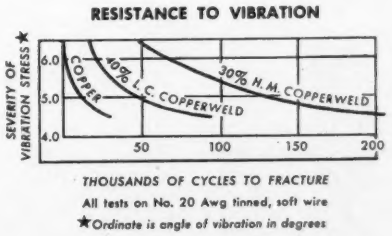
Antennas and Transmission Lines For Radio and Television

Copperweld is the ideal wire for antennas and transmission lines. Its



Frequency at which Copperweld becomes identical with copper in A.C. resistance

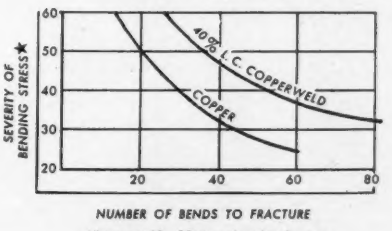
Fig. 3. — * * * * * *



All tests on No. 20 Awg tinned, soft wire

★Ordinate is angle of vibration in degrees

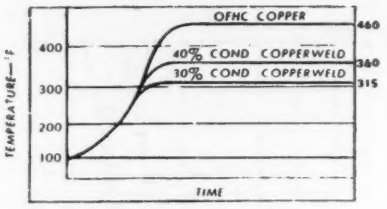
Fig. 4. — * * * * * *



All tests on No. 20 Awg tinned, soft wire

★Ordinate is angle of bend in degrees

Fig. 5. — * * * * * *



TYPICAL HEAT CONDUCTION CURVES FOR COPPERWELD AND COPPER WIRES

Fig. 6. — * * * * * *

strength is valuable on outdoor locations and its electrical properties are the same as copper at high frequencies. Copperweld wire is used extensively in the manufacture of 300 ohm twin lead and for the core wire in flexible type coaxial cables. Some use is also being made of Copperweld for the outer braid of coaxial and shielded cables.

Radio Frequency Coils

Copperweld wire is advantageous in the winding of radio frequency coils. It provides stronger coils and often permits lighter supports. Copper saving is an added feature and at high frequencies the Q of the coil approaches that of a copper coil.

Insulated Cords

Typical applications in this field include wire for geophysical surveys where vibration resisting properties are extremely important; also blasting wire where Copperweld has the added advantage of being magnetically attracted by magnetic separators. More and more, signal and control circuits are being constructed with Copperweld wire to get the added strength, smaller size, and copper saving features.

★ ★ ★

Another interesting application is in stranded leads for cords on household appliances, such as vacuum sweepers and electric razors, as well as industrial appliances, including electric drills and grinders. Here, a few Copperweld wires added to the copper wires strengthen the cords, reduce breakage and increase safety.

Appliance Wiring

Copperweld has been approved for the wiring of electric ranges. It provides a higher strength wire which resists breakage and is especially advantageous for connecting movable top burners where ordinary leads are subject to breakage.

Flexible Stranded Leads

Flexible stranded leads comprising three to seven Copperweld wires, together with 30 or more copper wires, are being used with excellent results. These Copperweld wires increase the strength of the stranded

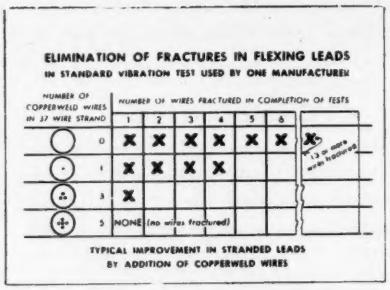

ELIMINATION OF FRACTURES IN FLEXING LEADS
IN STANDARD VIBRATION TEST USED BY ONE MANUFACTURER
NUMBER OF COPPERWELD WIRES IN 37 WIRE STRAND
NUMBER OF WIRES FRACTURED IN COMPLETION OF TESTS
1 2 3 4 5 6
0
1
3
5
NONE (no wires fractured)
TYPICAL IMPROVEMENT IN STRANDED LEADS BY ADDITION OF COPPERWELD WIRES

Fig. 7. — * * * * * *

leads and decrease vibration failures. For example, in one set of tests, leads composed of 37 x .005″ copper wires, showed 32%, 78%, 44% and 58% of the wires failed at the conclusion of a certain vibration test, while the substitution of 5 Copperweld wires for 5 of the copper wires in the lead reduced the number of failed wires to zero.

Electric Radiant Heating for Homes

In this type of home heating, insulated conductors are buried in the ceiling plaster and the proper heat maintained by a full voltage thermostat in each room. The 30% conductivity HM Copperweld conductor is very well suited for this service as small wires are essential, yet adequate strength is important to prevent breakage and open circuits during construction.

(*Please turn to page* 927)

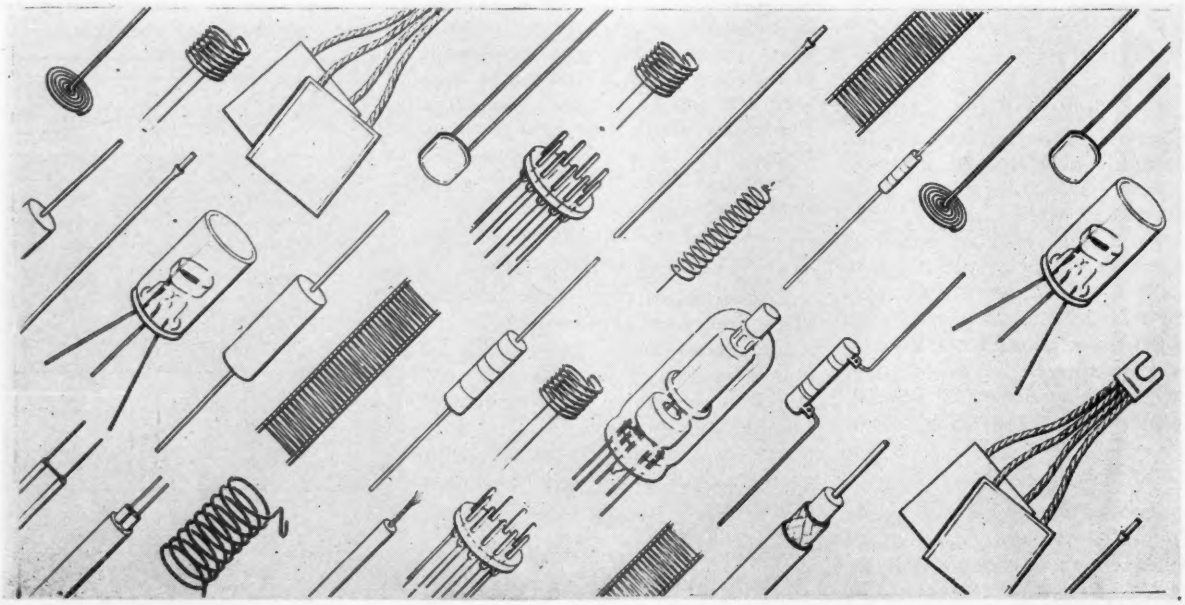


Fig. 8.—Copperweld Wire is replacing copper for these applications because it provides greater tensile strength, greater flexing strength, and ample conductivity. *

Cable Installations in Chemical Plants

by Victor Siegfried, Chief Research Engineer
and Walton P. Lewis, Engineer
Electrical Cable Works
American Steel & Wire Division
United States Steel Company
Worcester, Massachusetts

This paper, delivered before the American Institute of Electrical Engineers last winter, is published by permission and through the courtesy of the Institute.

The problem of specific applications for specialized locations is pointedly brought out with respect to installations of cable in chemical plants. At the 1950 Winter Meeting of The American Institute of Electrical Engineers, a session on Cable for Chemical Industries contained several excellent papers dealing with the various insulating materials available for such applications. The need was expressed then for further consideration of the subject from the standpoint of installations of such cables, which is the primary concern of this present discussion.

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While the authors do not profess to final authorities on the layout of plant electrical systems, their experience in reconciling the needs of the chemical plant electrical engineer with the advantages and/or limitations of the many available insulations gives them the courage to undertake this presentation. The problems of both the user and the maker of cable must be given equal weight in seeking a solution to the problem.

Requirements of Chemical Plants

Certain peculiarities of chemical plants set them apart from other industrial applications. These peculiarities are not always the governing conditions but are important to a proper engineering approach. Wet conduit is almost axiomatic in such plants, and the wetting material may be either acidic or alkaline in varying degrees. To protect against any such occurrence is not feasible, but drains are often provided to minimize such exposure. Oftentimes, the overflow of materials which are strong solvents of insulation may enter the cable system, and the time of exposure is of extreme importance in determining whether such accidents can be fatal to insulation.

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Ambient temperatures are usually not abnormally high, but occasionally outdoor runs of conduit in exposed locations encountering strong sunlight will be as hard on insulation as boiler-house ambients. Corrosive action on the conduit, while not primarily a cable problem, can accentuate the attack on cable if such penetration is unknown or unforeseen.

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Adequate copper for current-carrying capacity is more vital here than in usual service as any of the untoward conditions deteriorating insulation is accelerated by high temperatures. Long runs, also, are frequent in these plants, and voltage-drop considerations may become of paramount importance.

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The responsibility for weighing the important factors of reliability of service on all or on certain circuits, the economic justification for the more costly types of insulations, and the exposure to unavoidable hazards rests jointly on the plant engineer and the cable product engineer. Each must be aware of the problems the other encounters in making a choice so as to assess the installation as a whole. Conventional method employing lead jackets are not the sole answer in present day chemical plants. Corrosion of the lead sheath in iron or concrete conduits is a well-recognized possibility, particularly where electrolytic paths are aided by highly ionized solutions. Protection of the lead or its elimination for economic reasons are current approaches to this problem. Expected life of cable is of some importance where rapidly changing plant processes may dictate frequent circuit layout changes. In this event, it is well to follow the rule of not reinstalling older cables on important circuits, thereby permitting the use of a "calculated risk" philosophy on conductor size or type of insulation employed.

Cable Types Currently Available

The earlier types of electrical wire available for the various voltage duties included rubber and braid, rubber and lead, varnished cambric and lead, and paper and lead. Some of these soon proved vulnerable in chemical plants, and were augmented with protective coverings over lead sheaths, substitution of Neoprene jackets for lead, use of asbestos in conjunction with rubber or varnished cambric, and other similar advances. Much of the action of moisture (whether just water or solutions) has been retarded by the recent advent of improved rubber compounds designed to resist water absorption. This is attributable to the improved synthetic rubber-like polymers developed within the last few years and which have led to insulations given dual approval by the Underwriters' Laboratories for service in either hot or moist locations. Typical of these materials is acrilonitrile (Buna-N or GR-A) rubber which has aided, by itself being better protection against moisture and oil. Butyl rubber has become available for high voltage applications where heat is a factor, and with considerable moisture resistance as well.

★ ★ ★

The thermoplastic resins of the

polyvinyl chloride type have been a big factor of recent years in providing reliable power and control service at low voltages. Polyethylene has entered the picture both for its use in communication circuits, where its low dielectric loss is important, and for applications where its extremely good moisture resistance stands it in good stead. Its resistance to most of the common solvents is well known, but caution must be observed where the aromatic or aliphatic hydrocarbons (benzene, toluene, hexane, octane, etc.) are present, particularly in the chlorinated forms.

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These thermoplastic materials are vulnerable to flow from pressure or moderate temperatures. Hence they must be applied with discretion and installed with considerable care. Jacketing these materials with nylon in a thin film has added the very desirable abrasion resistance of this higher-melting plastic, and reduces the tendency toward flow by relieving the stresses and confining the insulating material in a relatively fixed diameter. Nylon by itself is not a good electrical material, but finds application on ground wires where abrasion, corrosion and mechanical damage are problems. Its transparency adds value here in permitting visible check on continuity of strands.

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Silicone rubber is a flexible material with a wide range in temperature applications. It is difficult to manufacture and is expensive, and has not had good physical properties until recent improvements by prime manufacturers had been effected. Its principal use is in extreme conditions of temperature. Here again, economic considerations must influence the design of the system, and often it is only the last short length of a cable that truly requires such high-temperature performance. The halogenated ethylenes, Teflon, and Fluorothene or Kel-F, offer high-temperature properties and chemical resistance, but cost of materials or difficulty in handling keep them from being the panacea for the chemical plant applications. Certain very special applications only serve to confirm their limited scope, in their rather cursory survey.

Comparative Data

Some data are offered here to compare these various materials with particular reference to the chemical plant installation. The Table is compiled from laboratory and reference data, and needs little

TABLE I

RESISTANCE OF INSULATING MATERIALS TO

E - Excellent
G - Good
M - Medium
F - Fair
P - Poor

	ACIDS (68° F	ALKALIS Exposure for	WATER 3 months	SOLVENTS	HEAT	COLD	FUNGUS	FLAME BURNS	SELF EXTINQUISHING	SOLVENT
Cellulose Acetate Butyrate	F	F	M	M	M	G	G			C,K,E,N, K,N.
Ethyl Cellulose	M	E	G	F	G	E	E	YES	NO	A,C,E,F, H,K,N.
Polyamide (Nylon)	F	E	E	G	M	G	E	YES	YES	Alcohols above Ethanol
Silicone Rubber	G	M	E	P	E	E	E	NO		C,H,I.
Vinyl Resins	E	E	E	E	G	M	E	NO		K,E.
Neoprene	E	E	E	G	E	M	E	YES	YES	C,E,H,K.
GR-S (Synth)	E	E	E	G	G	E	G	YES	NO	B,G,H.
GR-A Acrilonitrile (Buna N)	E	E	E	G	G	E	G	YES	NO	B,H.
GR-I (Butyl)	G	E	E	G	E	G	G	YES	NO	C,H,I.
Natural Rubber	M	M	E		M	E	F	YES	NO	B
Polyethylene	E	E	E	G	G (Stabilized)	E		YES	NO	H,I.
Flameproof Po									YES	
Teflon	E	E	E	E	E	E	E	NO		None

Code for Solvents:

A--Alcohols
B--Benzene
C--Chlorinated Hydrocarbons
E--Fatty Acid Esters
F--Furfural
H--Aromatic Hydrocarbons
I--Aliphatic Hydrocarbons
K--Ketones
N--Nitrohydrocarbons

explanation. Some differences between reaction to weak or strong acids and alkalies have been averaged out, as they are beyond the scope of this compilation. Known solvents for many of these materials are shown but without any claim for exhaustive elimination. Once again it must be reiterated that each application requires judicious consideration in its design, and these categoric classifications merely point out the types of factory that must be weighed.

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No one material seems to be proof against all possibilities, with the exception of the halogenated ethylenes discussed above. This leads to the conclusion that the primary attention should be focused on the power system itself so as to minimize the obvious hazards to the electric circuit by prevention, location or retardation. Sealing of ducts, drainage slopes, ventilation, and frequent inspection during operation suggest themselves. Then the less spectacular requirements can be given more consideration, with a possibility of simpler and less expensive cable specifications.

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Figure 1 shows a long-time curve of insulation resistance at 50 degrees centigrade immersion of the dual-marked RW-RH wire. By comparison with Type R building wire, this curve is very well maintained at a high level of megohms and is indicative of low moisture absorption in this type of compound. It is a synthetic rubber compound made possible by the special polymers mentioned previously.

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Figure 2 is a similar comparison of Types RW-RH wires showing the dielectric constant (SIC) characteristic on immersion at 50 degrees centigrade. The type R wire (without jacket) has a higher slope increasing in SIC much faster than its companion wires. Due to the manner of plotting, the curves cross, but absolute values were preferred for this discussion. Curves 2 and 3 are for RW-RH wire with 1/64th and 3/64ths Neoprene jacket respectively, and show a gradual increase typical of these compounds.

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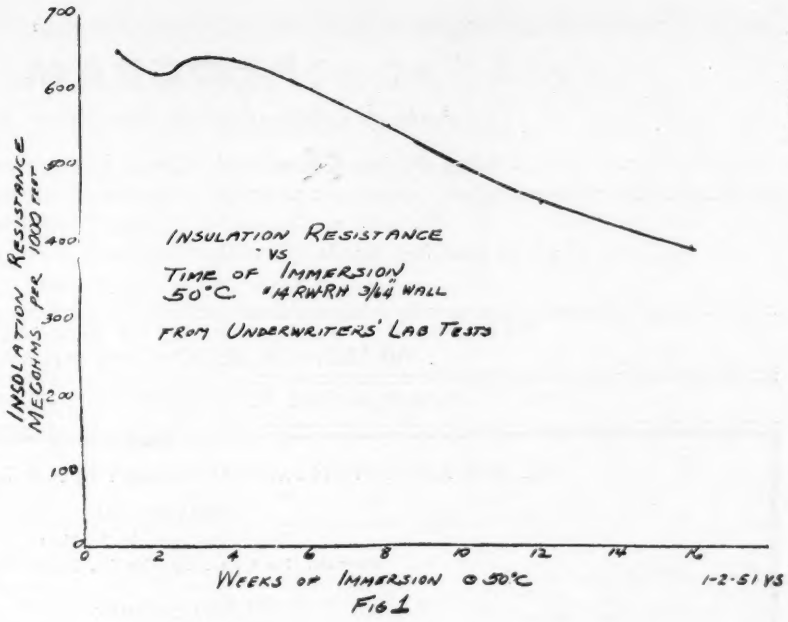

FIG 1

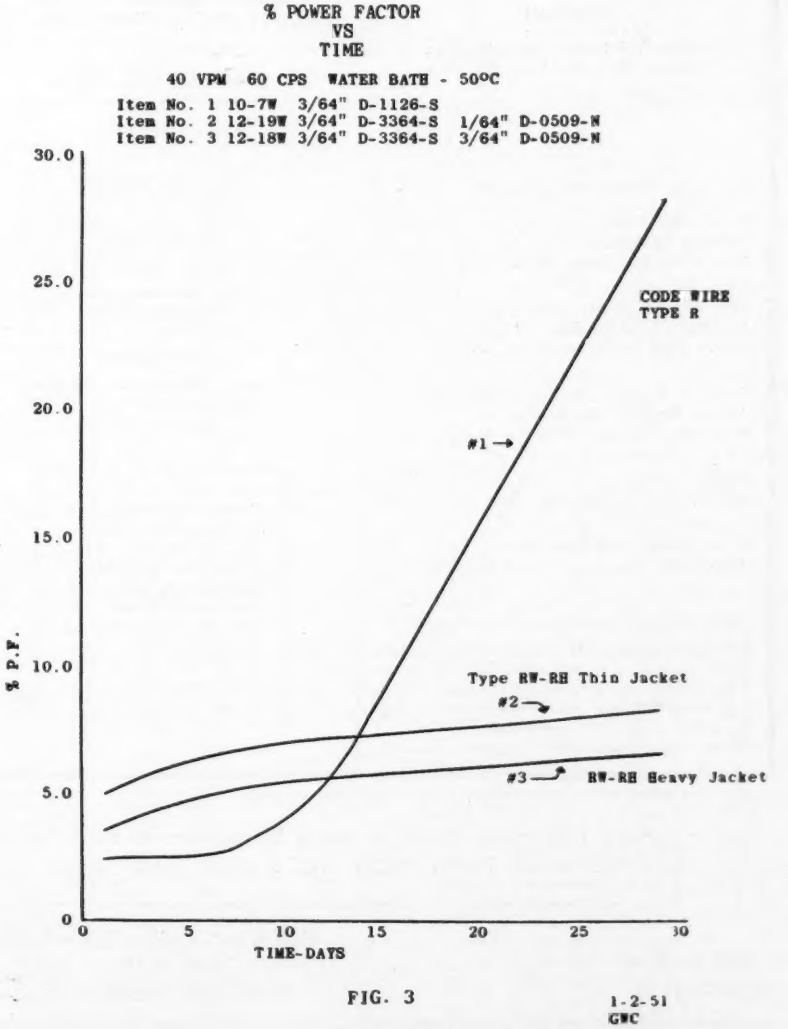

FIG. 3

1-2-51
GWC

PROGRAM

Annual Convention of The Wire Association

Carter Hotel, Cleveland, Ohio, November 10-13, 1952

The Wire Association's Headquarters at The Carter Hotel
will be open from Monday, November 10th, every evening during the Convention.
Come and get acquainted!

THERE WILL BE A REGISTRATION FEE OF $6.00 FOR THOSE ATTENDING
THE TECHNICAL SESSIONS AND INFORMAL MEETINGS.

ADMISSION WILL BE BY BADGE ONLY—PLEASE WEAR IT.

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Technical papers are preprinted in the October issue of Wire and Wire Products insofar as possible. Titles to papers accepted will be given to the Wire Association and duly copyrighted at the time of publication.

GENERAL ACTIVITIES

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The Wire Association
Stamford, Conn.

REGISTRATION

R. S. Spengel, Asst. Exec. Secy.
The Wire Association
Stamford, Conn.

ENTERTAINMENT

Eber J. Hubbard, President
Hubbard Spool Company
Garrett, Ind.

All papers presented at this Convention by members of The Wire Association are eligible for consideration for the Annual Medal Award, and will be voted upon by the Board of Directors at the next Spring meeting of that body.

NON-FERROUS DIVISION

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Copperweld Steel Corp., Warren, O.

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William L. Wells, Asst. Supt., Rod Mill
Scovill Manufacturing Co., Waterbury, Conn.

All wire mill men and suppliers are invited to attend this meeting, see how the Association functions and participate in the activities.

Hotel reservations should be made by members of the Wire Association direct to the Secretary.
MAKE YOUR PLANS NOW TO ATTEND AND SEND YOUR RESERVATION PROMPTLY

MONDAY, NOVEMBER 10th

9:00 A. M.
REGISTRATION

10:30 A. M
DIRECTORS' MEETING

12:30 P. M.
PROGRAM COMMITTEE LUNCHEON

THE CONVENTION PROGRAM

Carter Hotel, Cleveland, Ohio, November 10-13, 1952

MONDAY, NOVEMBER 10th

9:00 A.M. Registration Desk opens on the mezzanine floor.

10:30 A.M. Annual Meeting of the Board of Directors of the Wire Association.

12:30 P.M. Directors' Luncheon for Program Participants.

AFTERNOON SESSION—2:00 P.M.

Joint Technical Meeting for Both Ferrous and Non-Ferrous Groups.

CHAIRMAN OF MEETING

E. Jefferson Crum, Technical Consultant, R. H. Miller Co., Homer, N. Y.

Address of Welcome by John A. Moritz, Superintendent, Wire Mill, Keystone Steel & Wire Co., Peoria, Ill.
President of The Wire Association

PAPER: "Manufacture of Copper-Steel Wire by Electrolytic Process."	For many electrical applications, a copper-coated steel wire will serve and copper can be saved. How good coatings are produced is described.	by A. M. Gray, Asst. Supt., Development Eng. Western Electric Company Baltimore, Md.
PAPER: "Methods Improvement Study."	A discussion supplemented by a motion picture and slides, in which various methods of improving operations are depicted.	by Paul V. Crooks, Works Indus. Engr. Newburg Works American Steel and Wire Div. U. S. Steel Company Cleveland, Ohio

TUESDAY, NOVEMBER 11th

MORNING SESSIONS—9:30 A.M.

FERROUS SECTION

CHAIRMAN OF MEETING

Uno V. Johnson, Supt., Rod & Wire Div., Detroit Steel Corp., Portsmouth, Ohio.

PAPER: "Lime for Wire Drawing."	Discussion of improvement in lime coating through use of recirculating system, based on experience at Sparrows Point.	by Jere Heisler, Asst. Gen. Foreman, Wire Drawing Bethlehem Steel Company Sparrows Point, Md.
PAPER: "ACSR Wire."	The metallurgical requirements and manufacturing procedure in producing ACSR wire.	Frank Weise, Jr., Asst. Supt., Rods & Wire Portsmouth Steel Div. Detroit Steel Corp., Portsmouth, Ohio.
PAPER: "Selection and Processing of Chromium-Nickel Stainless Steels for Magnetic Applications."	A review of the effect of chemical composition and processing on the properties of these steels.	by F. K. Bloom & J. S. White, Metallurgists Rustless Div., Armco Steel Corp. Baltimore, Md.

NON-FERROUS SECTION

CHAIRMAN OF MEETING

Willard DeC. Crater, Asst. Mgr. Vinyl Sales, Naugatuck Chemical Co., Naugatuck, Conn.

PAPER: "Glass Micro Fibers in the Wire Industry."	The characteristics and applications of yarns made of the new super-fine glass filaments.	by R. E. Capaul, Vice Pres. and Gen Sales Mgr. Glass Fibers, Inc. Toledo, Ohio.
PAPER: "The Development of Improved Electrical Wiring Materials"	The case history of a new barn cable and principles that control new product developments.	by Vincent McBride, Chief Eng. Plastic Wire and Cable Corp. Jewett City, Conn.
PAPER: "Development of New Asbestos Insulated Magnet Wires."	The Application of a new asbestos product in combination with Fiberglas and Silicone varnish (for Class H Temps) or with Dacron Yarn (for Class B Temps) for high temperature magnet wires.	by Robert D. Peck, Dist. Engr. Industrial Products Div. Johns-Manville Sales Corp. Boston, Mass. and Edward B. Hall, Met. Kennecott Wire & Cable Co. Phillipsdale, R. I.

TUESDAY, NOVEMBER 11th (cont'd)

AFTERNOON SESSION—2:00 P.M.

FERROUS SECTION

CHAIRMAN OF MEETING

Joseph R. Carter, Johnson Steel & Wire Co., Worcester, Mass.

PAPER "The Drawing of Weaving Wire."	The progress made in weaving wire manufacture, with emphasis on present-day practices.	by Albert Knapp, V.P. & Chf. Eng. G. F. Wright Steel & Wire Co. Worcester, Mass.
PAPER: "Can Quality Control Be Used in the Wire Mill?"	Considers benefits of quality control thinking and traces typical problem through mill with and without quality control.	by H. H. Passolt, Metallurgist Johnson Steel and Wire Co Worcester, Mass.
PAPER: "Significance of The Elongation Test on Wire."	Limitations of percentage elongation illustrated and more reliable measures of ductility of hard drawn wire suggested.	by H. J. Godfrey, Asst. Chief Eng. Research and Development John A. Roebling's Sons Co. Trenton, N. J.

NON-FERROUS SECTION

CHAIRMAN OF MEETING

James E. Flood, Chem. Eng., Plastic Wire & Cable Co., Jewett City, Conn.

PAPER: "Dry Blending for the Vinyl Extrusion Industry."	The reasons for dry-blending vinyl compounds, the methods used and late developments that have improved them.	by M. G. Caine, Asst. Sales Mgr. Plastics Division Monsanto Chemical Co. Springfield, Mass.
PAPER: "Silicone Rubber: A New Insulating Material for Wire and Cable."	Describes silicone rubber and its history, processing technique, properties and applications. Comparisons with organic elastomers are made.	by M. G. Noble, Application Eng., Silicone Products Engineering, Chemical Div. General Electric Co. Waterford, N. Y.
PAPER:" Weathering Characteristic of Polyvinyl Chloride Type Plastics."	A study of major factors involved in making PVC compounds for outdoor use. Weathering tests are evaluated.	by J. G. Hendricks, Director and E. L. White, Asst. Director High Polymer Laboratory National Lead Co. Brooklyn, N. Y.

WEDNESDAY, NOVEMBER 12th

MORNING SESSIONS—9:30 A.M.

FERROUS SECTION

CHAIRMAN OF MEETING

William E. Hitchcock, Jr., Vice Pres., Atlantic Wire Co., Branford, Conn.

PAPER: "Creep and Relaxation of High Strength Steel Wires at Room Temperature."	Results of measurement of these characteristics in two wires subjected to high sustained stress or strain.	by Gordon T. Spare, Project Eng. American Steel & Wire Div. U. S. Steel Company Cleveland, Ohio.
PAPER: "Salt vs. Atmospheric Annealing."	Experience based on the use of both types of furnaces with indication as to which work each is adapted.	by E. S. Tyler, Metallurgist Atlantic Wire Co. Branford, Conn.
PAPER: "Design of a Galvanizing Furnace."	The author's company has designed and built five furnaces. The factors entering into the design of the latest oil fired furnace are discussed.	by William D. Bawden, Supt. Gilbert and Bennett Mfg. Co. Georgetown, Conn.

NON-FERROUS SECTION

CHAIRMAN OF MEETING

William L. Wells, Asst. Supt., Rod Mill, Scovill Mfg. Co., Waterbury, Conn.

PAPER: "Effect of Certain Impurities on Free Cutting Brass."	Copper shortage has forced use of poorer grades in making brass. Effect of impurities found are discussed.	by Grayson B. Wood, Jr., Metallurgist Scovill Manufacturing Co. Waterbury, Conn.
PAPER: "Cost Reduction Through Improved Plant Layout."	With material and labor costs rising, saving must be made through more efficient plant operation.	by D. M. Schmid, Vice Pres. & Genl. Mgr. Alloy Metal Wire Co. Prospect Park, Pa.
PAPER: "Control of Wet Wire Drawing Solutions for Copper."	An outline of practices showing how to start with the right solution and then to maintain it at a point of efficiency.	by Dr. Robert C. Williams Director of Research The Ironsides Company Columbus, Ohio.

WEDNESDAY, NOVEMBER 12th (cont'd)

AT 1:00 P.M.—THE ANNUAL WIRE ASSOCIATION LUNCHEON

Guest Speaker: Harvey B. Jordan, President, The American Steel & Wire Co., Cleveland, Ohio.

LADIES WELCOME! *LADIES WELCOME!*

The Mordica Memorial Lecture: "Three Score and Ten Years of Wire Making."
by Peter Igoe, Treasurer, Igoe Brothers, Inc., Newark, N. J.

THE PRESENTATION OF AWARDS FOR 1951

Medal Award: Dr. Bruce W. Gonser, Research Supervisor, Non Ferrous Metallurgy, Battelle Memorial Institute, Columbus, Ohio. for the most meritorious paper: "High Strength Copper-Silver, Copper-Iron and Copper-Iron-Chromium Wire."

Certificate of Honorable Mention for ferrous papers: Dr. Carl A. Zapffe, Consulting Engineer, Baltimore, Md., for the paper: "Surface Active Agents and Pickling Brittleness."

Certificate of Honorable Mention for non-ferrous papers: C. A. Litzler, President, Industrial Ovens, Inc., Cleveland, Ohio, for the paper: "Some Developments in Nylon and Polyethylene Wire Extrusion."

AT 4:00 P.M.—THE ANNUAL MEETING OF THE WIRE ASSOCIATION

This is the annual business meeting of members of the Association. Your personal attendance is needed and urged.

Chairman of Meeting
John A. Moritz, Pres.
The Wire Association

IN THE EVENING:

THE ANNUAL STAG SMOKER—DINNER

6:30 P.M.—Cocktail Bar Opens

7:30 P.M.—Dinner and Show

CHAIRMAN, ENTERTAINMENT COMMITTEE: Eber J. Hubbard, Jr.

COME ONE, COME ALL—AND HAVE A GOOD TIME!

THURSDAY, NOVEMBER 13th

This day will be devoted to plant inspection tours, two of which have been planned. These are to:

CUYAHOGA WORKS, AMERICAN STEEL & WIRE DIV., U. S. STEEL CORP.
Busses will leave the Carter Hotel at 9:30 A.M. and will return to the hotel at noon.

CLEVELAND WORKS, CHASE BRASS & COPPER CORPORATION
Busses will leave the Carter Hotel at 1:30 P.M., returning to the to the hotel before 5 P.M.

FOR EACH TOUR, PERSONS MUST GO BY BUS. NO PRIVATE CARS WILL BE ADMITTED AND TO BE ACCEPTED AT THE GATE, YOU MUST WEAR YOUR BADGE. THESE MEASURES ARE FOR SECURITY REASONS. NO EXCEPTIONS, PLEASE!

These Plant Inspection Trips Conclude the 1952 Convention

RESEARCH PAPERS ARE PREPRINTED IN THE OCTOBER ISSUE OF WIRE AND WIRE PRODUCTS

The Discussions and the Mordica Memorial Lecture will be printed in the January issue of Wire and Wire Products

Papers not received in time for preprinting will be published in the November and December issues of Wire and Wire Products.

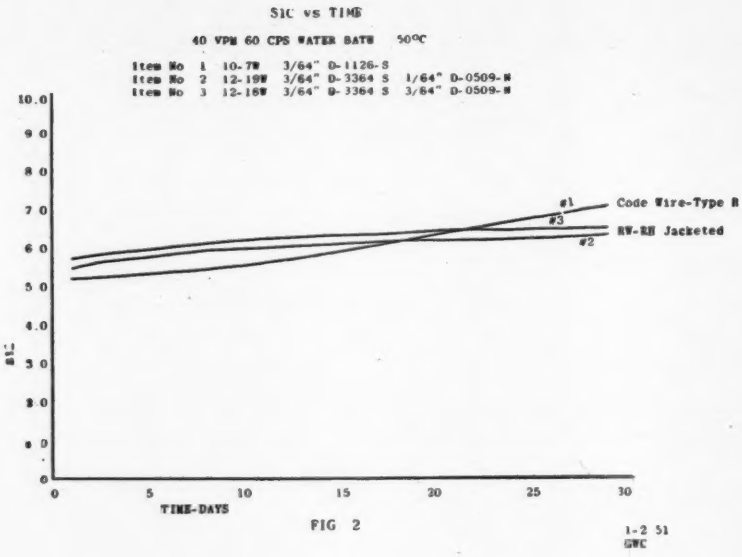
SIC vs TIME
40 VPM 60 CPS WATER BATH 50°C
Item No 1 10-7W 3/64" D-1126-S
Item No 2 12-19W 3/64" D-3364 S 1/64" D-0509-N
Item No 3 12-18W 3/64" D-3364 S 3/64" D-0509-N
#1 Code Wire-Type R
#3
#2 RW-RH Jacketed
SIC
TIME-DAYS

FIG 2

1-2 51
GWC

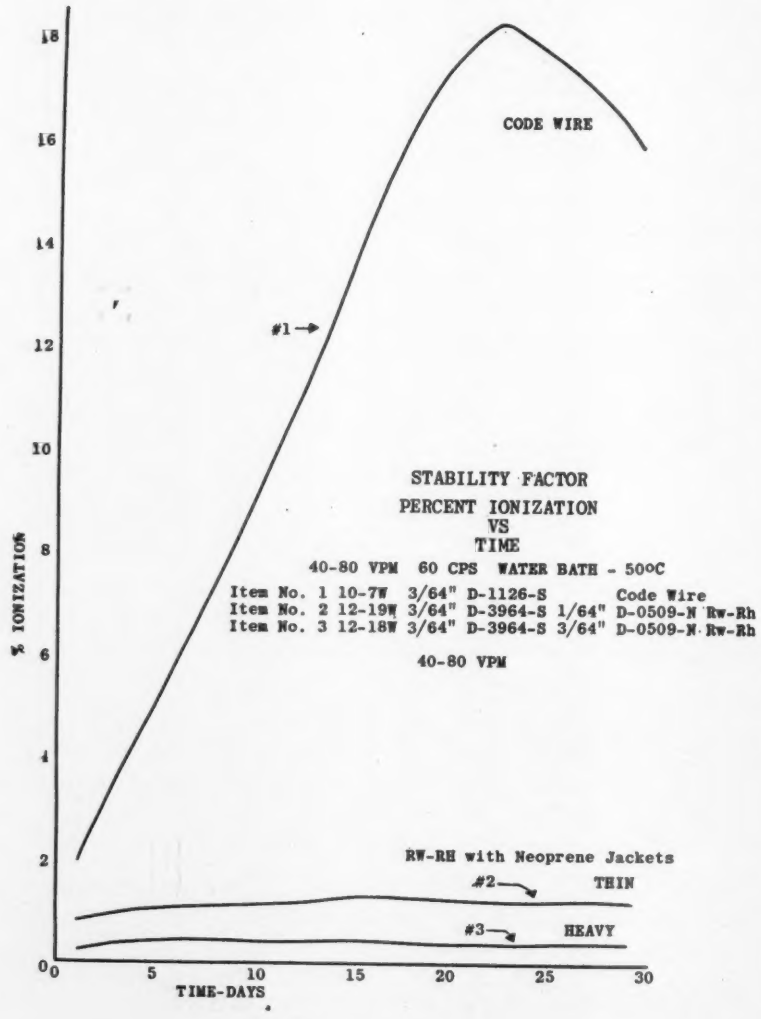

FIG. 4

1-2-51
GWC

The power factor of these wires is even more startling, with the Type R curve climbing rapidly in Figure 3, while the two jacketed RW-RH curves are comparatively flat.

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The stability factor or ionization curves of Figure 4 show this same comparison when the 60-cycle voltage is raised to 80 volts per mil, the increment from 40 vpm being a measure of ionization or stability of the compound. The influence of the Neoprene jacket is seen here, being itself a moisture barrier to add to the protection of the insulation compound. The heavy jacket shows stability of twice that of the thin jacket, both samples being vastly superior to conventional building wire.

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We submit that a well-designed power system subject to only occasional floodings with strong chemicals might withstand considerable moisture with this rubber-jacketed rubber-insulated cable of the RW-RH type, and avoid expensive alternatives.

Conclusions

The problem of cable installations in chemical plants is one which should be approached with an open mind, and calls for the joint efforts of chemical and electrical engineers on both sides. Good design is the essence, and knowledge of the limitations of the cable materials on the one hand and of the plant location and products on the other will speed its recognition. A mutual appreciation of each others' position will help immeasurably, and this has been the aim of this discussion.

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No one type of cable will fit all needs. Expensive designs of cable are not necessarily best, and a good balance between the physical structure housing it and the electrical system will result if all the facts can be ascertained at the outset. Speaking for the Industry, Engineering Consultants are generally available to assist plant engineers in arriving at this balance and are glad to be of such service. Economic considerations must be included in any good

(*Please turn to page* 917)

Your Company is "Exhibit A" To Your Employees

by Fred Rudge, Partner
Fisher, Rudge & Neblett
New York, N. Y.

Most of us can remember when few employers sincerely wanted their employees to become interested in economics—because then workers would ask questions that were "none of their business." I remember one company president who said to me, one day when we were discussing his annual report, "When our directors got together in the old days, to look at the financial statements, we actually used to pull down the shades, fearing that someone in the yard might get a look at the figures!"

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Now the emphasis is quite the other way—literally hundreds of leading corporations are **teaching** their workers economics—and sitting up nights planning ways **to get employees to ask questions.** Those who have done the best job of explaining economic principles seem to be the ones which concentrated from the very start on examples taken from the company's own history, development and experience. On the other hand, firms whose management insisted on featuring global economic trends and theories, or what the management believed was good for employees to know, found their programs too general (and too dull) to hold the workers' interest.

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Company programs of economic education for employees are shifting more and more from attempts primarily to "sell" the private enterprise system to one of helping workers understand the economic "facts of life" **about the company**—and why the management pursues the course it does in conducting operations. A study of successful programs proves that employees crave this second type of information, and that supplying it to them in a form they can grasp is the surest means of increasing their economic understanding.

ABOUT THE AUTHOR

Fred Rudge is a partner in the firm of Fisher, Rudge & Neblett, a management consulting service to over 70 corporations in the field of industrial, labor and community relations. He is the author of "Economic Information for Employees," published this year by National Foremen's Institute, New London, Conn. He also wrote the section on Plant Community Relations in Funk & Wagnall's "Reading Course in Executive Techniques."

Mr. Rudge, who went to Haverford College and Columbia University, was founder and president, from 1932 to 1945, of William E. Rudge's Sons, a printing house specializing in corporate annual reports and other public relations brochures. He is a director and secretary of the National Management Council, of the New York Association for the Blind, and of the Dalzell Towing Company of New York.

The reason why so many companies want their people to know more about economic facts and principles is that nine-tenths of all the decisions top management makes are based on economic considerations. Employees, consciously or unconsciously, are always passing judgment on management's acts and policies—and the verdicts are apt to be unfavorable if they are based on partial information or misleading "grapevine" reports. But experience shows that if workers understand what makes the company "tick," economically speaking, they usually see things in a different light. Actually, no one can grasp the significance of managerial decisions, or discuss them intelligently, without knowing the ABC's of business economics.

Employees Want Economic Information

The president whose board of directors pulled down the shades to keep the figures secret were dealing with a different type of employee than they would today. The general level of education has risen considerably, not only because of newspapers, magazines, radio and television, but also because kids stay in school longer than they used to. Naturally, the more people read and think and learn, the less content they are to just take an order and carry it out. They will follow instructions faster and more effectively if they know the "why"—and if the "why" makes sense to them.

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Employee appetite for economic information is demonstrated by the questions they ask when something happens in the plant. They gripe and ask "How come?" when things aren't running smoothly. If a schedule is changed, and short runs interrupt production, they want to know why. If the maintenance program is cut in slack times, they grouse about it and wonder why things that should have been done are left until business picks up and the plant is too busy. Or they ask, "Why can't we put all of our production workers on an incentive plan? Why do we have so many forms to fill in? Why don't we get more help in our department?"

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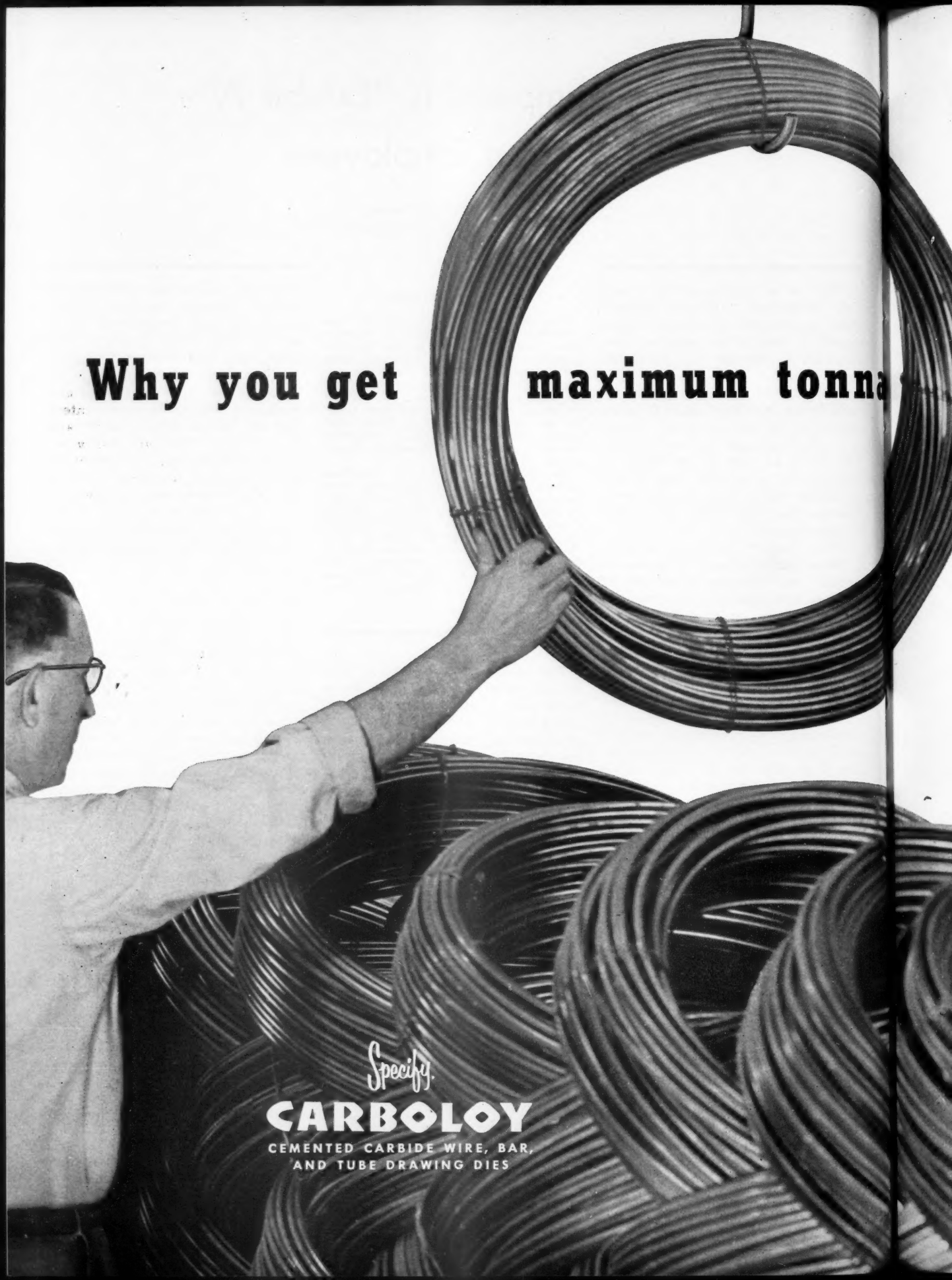
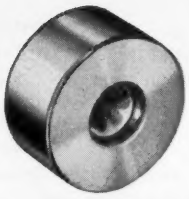
Hence economic education for employees really rings the bell when it is designed and conducted to give the rank-and-file the basic information they require—and which they crave so they can be in a position to judge management's acts and policies. Since they are going to do the judging anyway, it pays to give them the right evidence. By the same token, it pays to make the company "Exhibit A" in the education program.

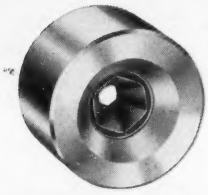
Start with Employees' Own Problems

Even in the company-oriented program, the best starting point is


Why you get maximum tonna
Specify
CARBOLOY
CEMENTED CARBIDE WIRE, BAR,
AND TUBE DRAWING DIES

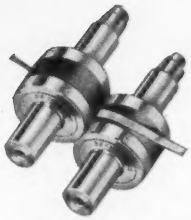


Carboloy Round-Hole Dies: Exclusive hot-forge casing process gives greater over-all strength and compressive backing.



Carboloy Hex Dies feature larger bell openings. Permit better lubrication, give better-shaped rods of any material you use.

Carboloy Capstan Rings pull wire through die, resist wear of severe tension and abrasion. Help keep production rolling.



Carboloy Wire-Flattening Rolls provide accurate sizing and finishing as round wire is rolled into a specified flat strip.

Carboloy Special-Shape Dies: Available rough-cored, rough-drilled or finished. Send specifications for quotations.

with Carboloy wire dies

You'll cut costly downtime from your wire-drawing operations with extra capacity, extra stamina of Carboloy dies. Made of Carboloy Cemented Carbide, hardest man-made metal, they stay on the job longer, deliver profitable, maximum tonnage.

What's more, backed by the most comprehensive service program, you get all carbide benefits, all production benefits. Carboloy field engineers will trouble-shoot your tough applications, and Carboloy Die Service Centers assure quicker resizing with far less time lost.

Let the Carboloy Factory Training School teach your key men latest carbide techniques for greater over-all efficiency. And be sure to send for your copy of the valuable 48-page, illustrated Carboloy Die Service Manual D-119.

Check today with your Carboloy representative to make certain you're getting maximum tonnage from your Carboloy dies.

"Carboloy" is the trademark for the products of Carboloy Department of General Electric Company

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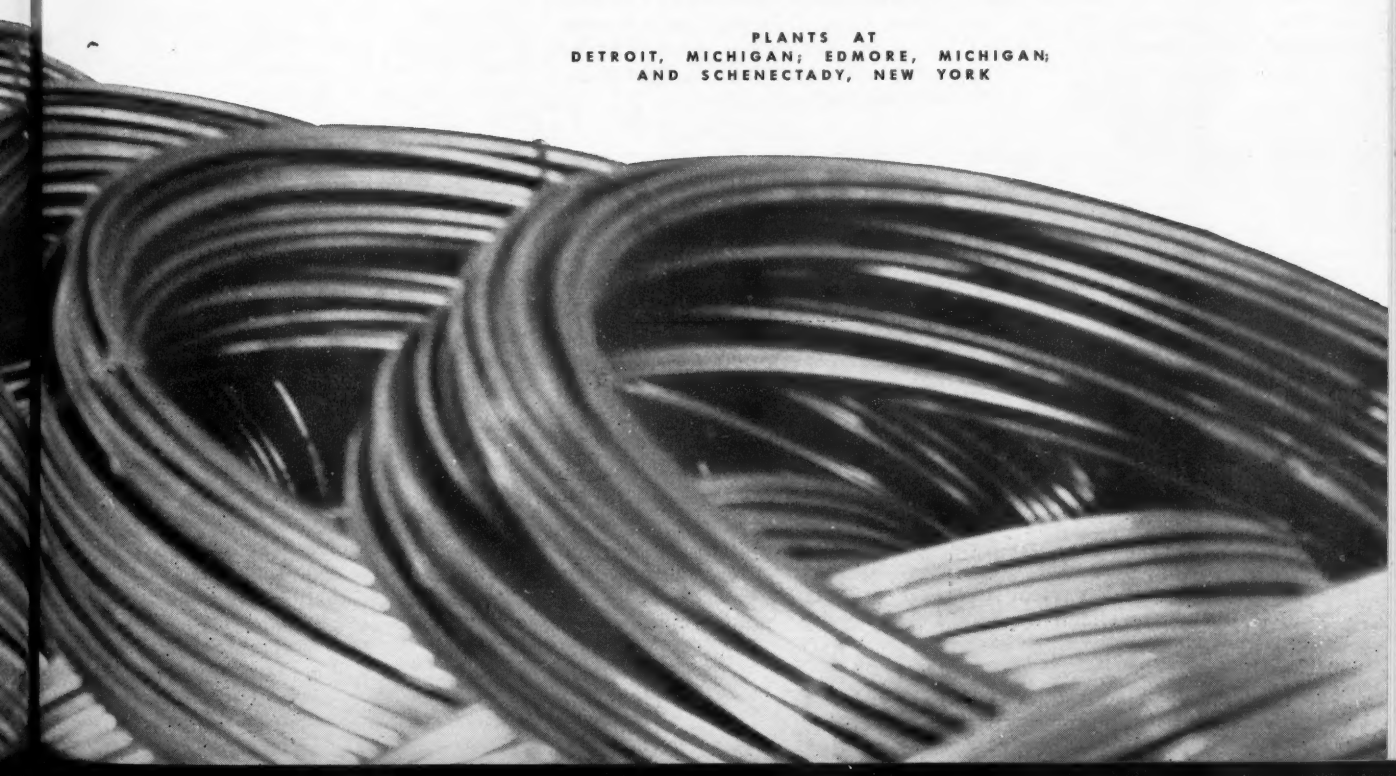
DEPARTMENT OF GENERAL ELECTRIC COMPANY

11171 E. 8 Mile Blvd., Detroit 32, Michigan

PLANTS AT
DETROIT, MICHIGAN; EDMORE, MICHIGAN;
AND SCHENECTADY, NEW YORK



the worker's own experience, which he may or may not recognize as being "economics". Every time he receives his salary, or pays his rent, or repairs his roof, he is taking part in some phase of the enormously complex system which governs our existence. Depth attitude surveys conducted by our firm in many plants show how the average employee extends his personal experiences into his thoughts about the company where he works. The chain of association runs something like this:

—Why is my work "worth" a certain number of dollars every month?
—Why do people pay money to my company?
—How did the company get started in the first place?
—What are my chances for holding on to my job?
—How has the company been able to survive as a business organization?
—Will the company survive in the future?

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Questions like these open up areas for discussion that quickly "cover the waterfront" of basic economic facts about business. It isn't easy to marshall all the needed information about a company or its industry. Such information rarely can be dug from textbooks. The best sources are the firm's own executives, its sales department personnel and the trade associations to which it belongs. Getting it together demands a systematic effort of contacts and interviews. Naturally all material so obtained should be screened for accuracy by qualified management personnel.

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Useful background data can be obtained from organizations like the National Industrial Conference Board, American Management Association, Foundation for Economic Education, National Association of Manufacturers and the Chamber of Commerce of the U. S. A.

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With a fair amount of digging, enough facts can usually be found to provide all the "text" a successful economic education project requires, especially when the latter is livened up with current news which has a bearing on the subjects under consideration. Bear in mind that the really effective programs are those which tell employees what they want to hear—facts which have a bearing on their job security, their opportunities for advancement, improvements in their social status, and the like.

Organizing Company Information

Company information falls logically into a certain pattern, which in turn outlines the curriculum for the course. Here are some of the areas which unfold as the information is gathered:

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1. **How the company got started.** In almost every case, investigation proves that three basic elements were present when a company began: (1) an idea; (2) courage, and (3) capital. The original idea was motivated by an urge to make money, and the founders probably understood the risk they ran—since three out of five new ventures fail. Hence the premium on courage, which remains a needed ingredient no matter how large the organization has grown.

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Capital was needed not only to start the business, but also to keep it growing—to replace worn-out equipment and finance expansion, thereby providing more jobs for more people. As our population grows, some $5.5 billion a year in new capital is required, just to provide work and working equipment for the normal additions to our labor force. Points like this have tremendous impact when **actual figures about the company** are introduced and emphasized.

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2. **Where does the money come from on which the company operates?** This question opens the door for explaining the various types of investment which provide the firm with working capital—common and preferred stocks, bonds, debentures, and so forth. Also under the same heading come the four possible sources of equity capital in the future—(1) retention of earnings; (2) increasing the incentive for present investors; (3) by allowing life insurance companies and other financial institutions to subscribe equity capital. Source No. 4—government investment—affords temporary relief in emergencies, often followed by unfavorable consequences, such as government competition, possible corruption, reduction of incentives which encourage economic growth, etc.

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3. **Our competitive economy.** Almost every American company at some time in its history has had to make some radical change in its products, its production methods or its sales approach in order to meet competition and survive. Spelling out these hurdles makes an exciting story for its employees to read. The impacts of mass productions, of changing price levels, and shifts in buyer demand, are dramatic proof of inspired leadership. So is the firm's program of research and development, leading to new products and new applications.

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4. **How prices are set.** Here we enter the realm of supply and demand, of purchasing power and "real" wages, and of government regulations—including wage and price control. Here is the peg on which to hang the company's own price history—and the need for cost reduction and control.

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5. **The function of profits.** Dividends to attract and hold investment are only part of this story, spelled out in terms of the company's past experience and future needs. Equally relevant is the need for accumulating reserves for replacement and for the possible "rainy days" that troubles management as well as employees in their capacities as individual spenders and savers.

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This also gives management a chance to tell, without "preaching," how the company makes a profit and where the money goes, as well as to answer such questions as: How do earnings compare with total sales? How much was earned per share of common stock? Was this a fair return on the stockholders' investment?

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Every company has a document which can plan a stellar role in the economic education program—its balance sheet and income statement. Every year more companies make such information available to

(*Please turn to page* 925)

Government Wire Production Information

Universal Non-Corrosive Solder

A "flux" paste which can be used for soldering a variety of metals and is non-corrosive, is described in a Government research report now available from the **Office of Technical Services of the U. S. Department of Commerce.**

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Scientists working for the Army Signal Corps to develop a soldering flux useful on such difficult-to-solder metals as steel, nickel and aluminum, tried out a number of flux compositions, all of which are described in this report. They succeeded in finding two paste compositions which: 1) could solder the difficult as well as the easy-to-solder metals; 2) were non-corrosive; and 3) could be formed into the core of flux-core type solder.

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In the course of this research project the scientists developed a new process for making a flux paste from rosin by precipitating the rosin in a finely divided form from a solution. Also, they developed an improved "corrosion-current" method for testing the corrosiveness of soldering fluxes.

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PB 106584, Progress and Summary Report on Non-Corrosive Flux Paste for Universal Application, 56 pages, including a number of tables and several illustrations, sell for $2.75 in microfilm and $7.50 in photostat form. Orders should be addressed to the Library of Congress Photoduplication Service, Publications Board Project, Washington 25, D. C. Enclose check or money order payable to the Librarian of Congress.

DPA Arranges for More Cryolite

At the request of the Defense Production Administration, arrangements have been made to expand the facilities of the Aluminum Ore Company at East St. Louis, Ill., for increased production of synthetic cryolite.

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Up to now the company has produced synthetic cryolite only for the use of its parent concern, the Aluminum Company of America. Under the present arrangement, the company's output will be increased by approximately 11,000 tons a year to help meet the needs of the country's expanding aluminum program. Cryolite is used as a flux in reducing alumina, a powder, to aluminum.

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The only present source of natural cryolite is a mine in Greenland. A contract to increase the country's supply from that source by 13,700 tons was negotiated recently by DMPA.

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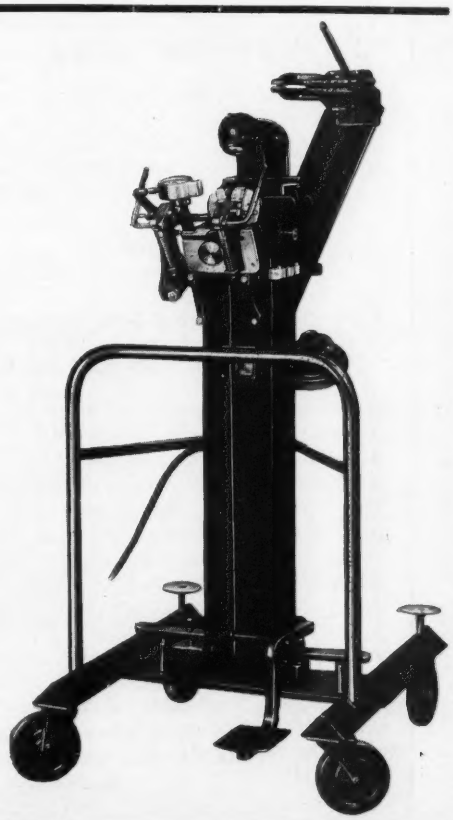
MICROMETER PRECISION MICRO-WELD TRADE MARK REGISTERED

MODELS J-3-S and J-4-S AUTOMATIC MICRO-WELD BUTT WELDERS

These welders are used for welding high and low carbon STEEL, and STEEL ALLOY wire, ranging in size from .020" to .160" diameter. All operations on these units, which include the clamping of the wire being welded, contacting the welding switch, and upsetting the weld, are made by a single downward stroke of the foot pedal. Welders for high carbon steel wire are equipped with the exclusive MICRO-WELD Dial indicating annealing device to facilitate the annealing operation of high carbon wire.

Standard equipment with these units include annealing dies, filing vise, light extension cord, and mounting on a 4-wheel truck. Special units can be furnished for crane mounting.



MICRO PRODUCTS CO.,

20 NO. WACKER DR., CHICAGO 6, ILL.
Telephone: STATE 2-7468

AMERICAN CHEMICAL PAINT COMPANY
AMBLER CHEMICALS ACP PROCESSES PENNA.

Technical Service Data Sheet
Subject: IMPROVED DRAWING AND COLD FORMING WITH GRANODRAW

INTRODUCTION:

When steel is phosphate coated with "Granodraw" prior to working it, drawing, extrusion, and other cold forming operations are greatly improved. In fact, the protective phosphate coating makes the cold extrusion of steel possible.

Getting cold steel to flow depends on the unique properties of this coating. Its non-metallic phosphate crystals are physically and chemically adapted to acquire a strongly adsorbed lubricant. The combination of adherent phosphate coating and adsorbed lubricating film possesses a low coefficient of friction while maintaining its integrity under extremely high deforming pressures.

The drawing of wire and many other cold forming operations — including the cold extrusion of steel — are greatly facilitated by the application of a "Granodraw" phosphate coating and a suitable lubricant prior to working.

"GRANODRAW" DATA

"Granodraw" zinc phosphate coating chemical is applied to pickled surfaces in an immersion or spray process. When used with a suitable lubricant, the coating reduces friction under conditions of low, medium, or high deforming forces encountered in such typical operations as: cold extrusion of steel; cold shaping; deep drawing (tubs, cartridge cases, shells, etc.); stamping; drawing of wire and tubing; ironing; necking; nosing; and upsetting.

ADVANTAGES OF PHOSPHATE COATING WITH "GRANODRAW" PRIOR TO COLD FORMING STEEL

The following are among the advantages indicated for phosphate coating with "Granodraw" prior to cold forming steel:

Drawing of wire, bars, tubing, etc. — Improved lubrication; improved surface; less scratching; reduced pull; greater percent reduction per pass; reduced die wear; longer die life; lower die maintenance and cost; reduction in corrosion.

Drawing of stampings, shells, shell cases, etc. — Improved lubrication; reduced breakage; reduction in scrap; deeper draws; less scratching; elimination of some annealing; less wear on dies.

Cold Extrusion — Improved lubrication; increased strength of parts; improved surface; reduction in load on press; greater dimensional accuracy; more uniform wall thickness; longer extrusions; elimination of some annealing; less corrosion.

CHEMICALS ACP PROCESSES

WRITE FOR FURTHER INFORMATION ON "GRANODRAW" AND ON YOUR OWN METAL PROTECTION PROBLEMS.

CHEMICALS ACP PROCESSES

June Bibliography of Technical Reports

A new soldering flux which is non corrosive and can be used to solder metals that could not be soldered before is one of the new technical developments described in the June issue of the **Bibliography of Technical Reports,** now available from the Office of Technical Services, U. S. Department of Commerce.

★ ★ ★

This issue of the **Bibliography** lists over 200 Government research and development reports made available to the public this month. Reports describing technical developments in the chemical, mineral, metalworking, food, textile, and electronic industries are included.

★ ★ ★

The June, 1952 issue of the **Bibliography of Technical Reports** sells for $.50 a copy, (yearly subscription rate of $5.00 includes the Newsletter) and may be purchased from the Office of Technical Services of the U. S. Department of Commerce, Washington 25, D. C. or through the U. S. Department of Commerce Field Offices. Orders should be accompanied by check or money order payable to the Treasurer of the United States.

★ ★ ★

Government to Buy Lead

Jess Larson, Administrator of the **Defense Materials Procurement Agency,** announced in July that the Government will buy 30,000 tons of lead during the remainder of this year to assure future availability of the metal for defense and other essential purposes.

★ ★ ★

The purchase program, which has been under consideration by interested agencies of the Government for several months, has been authorized by the Defense Production Administration.

★ ★ ★

The actual puchases, at the market price, will be made by the General Services Administration's Emergency Procurement Service. Lead purchased by the Government under the program will be held in reserve for resale to industry as needed. At the end of 1952, any lead remaining in the reserve will be turned over to the National Stockpile.

Dealing with Government Made Easier

Another step in the General Services Administration's program of making it easier for the businessman to deal with the Government has been announced in connection with Federal Supply Schedules which GSA uses to buy a wide variety of commercial products for the Federal Government.

★ ★ ★

Jess Larson, Administrator of General Services, said "bidders henceforth will get more information about what we are trying to buy, with the result that their bids should be more accurate."

★ ★ ★

He outlined two significant plans:

1. **Today when a businessman quotes to GSA on an "indefinite-quantity contract, he is quoting a fixed price for delivery to Federal agencies throughout the period of the agreement, which may range from three months to one year, depending upon the commodity, without knowing the total amount of merchandise he may be called upon to supply. It is the plan to make available to suppliers in future solicitations for bids a more accurate estimate of the amount of the requirement for the period involved. This will be calculated on the basis of orders placed during the preceding contract period.**

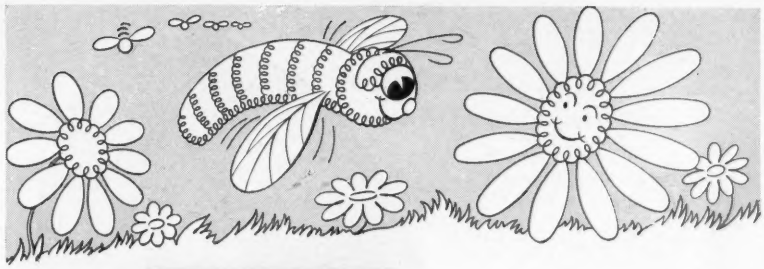
2. **In those instances where quotations are requested on an "all or none" basis, such as for a group of related items, the method of determining which bidder is low will take into account the unit price as offered on each item and the number of each item expected to be supplied. The method will, therefore, permit determination of a total price offered on all items being solicited instead of merely determining prices on individual items without relating them to a total. However, that it is not the general practice to request "all or none" bids; but that the instances where it is in the interest of the Government to do so, the above procedure would be followed.**

★ ★ ★

It was also explained that the above procedure, which applies to indefinite-quantity term contracts, will not affect the basic policy of GSA to purchase in definite quantities whenever advantageous to do so.

Patronizing Our Advertisers

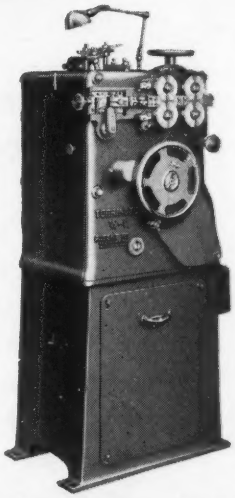
These are the progressive concerns who stand behind their products and have reputations worth sustaining and you can depend upon them.



A very good solution to your spring problem. See the man with a Versatile Torrington Spring Coiler

In spring coiling, the words "Torrington" and "Versatile" are synonymous! When you desire springs produced to meet exacting requirements, just call the professional springmaker who has a Torrington coiler. He's the man who can fill your needs with accuracy, speed and economy. On special springs, our sales department will gladly assist you in finding a source of supply, or help your springmaker devise just the right tooling to produce it.

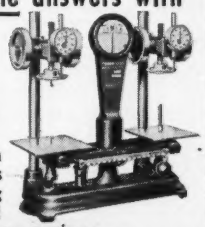
Torrington's 14 different Spring Coilers cover a range of wire diameters from .003" to .750"



MODEL W-11 SPRING COILER

Wire diam. range: .015" to .072". Length per spring: 0" to 42". O. D. Coil Range: 3/32" to 1 9/16". Produces 23 to 190 springs per minute with variable speed drive. Extra wire feed gears, torsion, other attachments available.

NOW... Spring Makers and Users can get the same answers with The TORRINGTON SPRING TESTER



An accurate, uniform and inexpensive means of measuring spring load and deflection! For inspection or in-use testing . . . to aid in designing and developing springs for specific uses or as a basis for statistical quality control. Write today for illustrated bulletin on the Torrington Spring Tester!

The TORRINGTON MANUFACTURING COMPANY TORRINGTON, CONNECTICUT

● **Corrosion resistant**
● **Extra strength** ● **Uniform temper**

Keystone's Galvanized MB Wire offers improved corrosion resistance . . . gives added life and strength to mechanical springs subject to rust and corrosive conditions. This is due to Keystone's unique method of galvanizing the wire before it is cold-drawn. The drawing process smooths and hardens the galvanized finish, improving its lasting qualities. This smooth finish, corrosion resistant spring wire is also furnished in Type 2 and Type 3 heavy weight zinc coatings before drawing to meet specified salt-spray tests.

INDUSTRIAL WIRE SPECIALISTS

Keystone Steel & Wire Company
PEORIA, ILLINOIS

Tensile Properties of Nickel

A study of the effect of temperature on the tensile properties of high-purity nickel has recently been completed by the National Bureau of Standards.[1] Tensile tests were made at temperatures ranging from —320° to 1500°F on annealed specimens of nickel of 99.85 percent purity. The study was conducted by **William D. Jenkins** and **Thomas G. Digges** of the NBS thermal metallurgy laboratory.

★ ★ ★

The new work is a continuation of previous NBS studies of high-purity copper and copper-nickel alloys. These two metals are both available commercially in very high purity, and they and their alloys are suitable for many industrial applications. The two metals have unlimited solid solubility in each other (can be alloyed in all proportions), and these alloys have relatively high strength at elevated temperatures and are corrosion resistant in many environments. For all of these reasons the study of the copper-nickel binary system has considerable interest and significance.

★ ★ ★

Two series of tests were made in this NBS study of nickel. The first series was made in the range from room temperature to 1500°F. Specimens were 6½ inches long, with 2-inch-long reduced sections of 0.505-inch diameter. Each specimen was heated and maintained at the desired test temperature, then tested in a hydraulic-type machine (15,000 lb range). The testing machine applied tension to the specimen, producing extension at a controlled rate of about 1 percent per minute. The movement of the head and the tension applied to the specimen were recorded by means of an automatic stress-strain recorder.

★ ★ ★

The second series of tests was made at temperatures ranging from —320° to plus 212°F. Specimens were essentially the same as those used in the first series, but the procedure had to be modified to permit them to be fully immersed in a liquid bath during the testing in tension. Loading was controlled to produce contraction of the smallest section of the specimen at a rate of approximately 1 percent reduction

of area per minute. A special reduction-of-area gage measured the change in minimum diameter of the specimen during testing.

★ ★ ★

In both series of tests, specimens were extended to the point of fracture. Fractured specimens were examined metallographically and tested for hardness. Various graphical comparisons of relations between the observed data were then made.

★ ★ ★

The NBS study of nickel shows that in general the metal's yield and tensile strength, and also the ductility at maximum load, tend to decrease with increase in temperature. The elongation at complete fracture attains a minimum at about 500°F. However, irregularities appear in the usual trends of some of the tensile properties in the temperature ranges of about 80° to 300°F and 500° to 700°F. Strain aging apparently occurs in the range 80° to 300°F, and Curie point behavior in the range 500° to 700°F, while recovery and recrystallization predominate at temperatures of 1200° to 1500°F.

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[1]For a detailed report of the study, see "Effect of Temperature on the Tensile Properties of High-Purity Nickel", by William D. Jenkins and Thomas G. Digges, J. Research NBS 48, 313 (April 1952).

★ ★ ★

Domestic Metal Expansion Projects

A total of 436 expansion projects to boost domestic production of needed metals and minerals, not including new projects in the aluminum expansion program, were approved by the Defense Materials Procurement Agency during the Fiscal Year that ended June 30.

★ ★ ★

The 436 projects—all in the United States and its possessions and territories—involve an industry outlay of nearly $672,000,000. Nearly all the projects require the allocation of controlled materials — copper, steel and aluminum.

★ ★ ★

Priority ratings in connection with the projects were issued during the year for $196,233,000 worth of production machinery and equipment and for $32,564,000 worth of con-

Cover non-metallic sheathed cable, building wire and weatherproof wire

1800 feet an hour

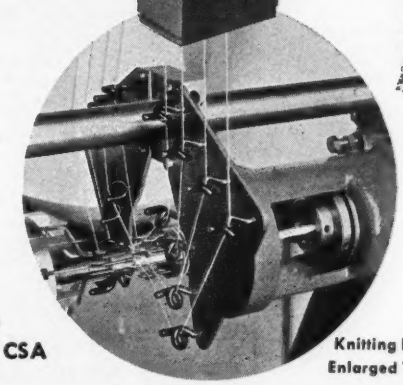
with

***Fidelity* SINFRA**

KNITTERS

Model C-3H Knitter & Haul-Off Reel Stand

★ Increase speed 10-15 times
★ Save on cost of yarn
★ Boost labor output 600%
★ Eliminate yarn rewinding
★ Conserve floor space
★ Cut maintenance costs
★ Reduce power requirements
★ Minimize operating noise
★ Improve working conditions
★ Provides automatic control
★ Lower your capital investment
★ Approved by UL, ASA, AAR, CSA



Knitting Head Enlarged View

This *Fidelity Sinfra* Wire Covering Machine offers you high production speed and low operating cost. The output of *one* Knitter equals 15 conventional machines. Savings in yarn costs and direct labor alone pay for this new equipment in 12 to 24 months. Knit products are universally used and meet all standards.

The modern Fidelity Sinfra method uses fewer yarns and large 3 pound cones located on a stationary creel. High-speed, rotating Knitting Heads cover the wire at 30 or more feet per minute. Design permits horizontal operation at convenient working level with no crawling or stretching. Automatic electric stop motions and other advanced features cut maintenance and down time.

To see why top companies choose Fidelity, read our literature proving its advantages. Write today for Catalog W.

Manufacturers of intricate precision machinery since 1911

FIDELITY MACHINE COMPANY INC.

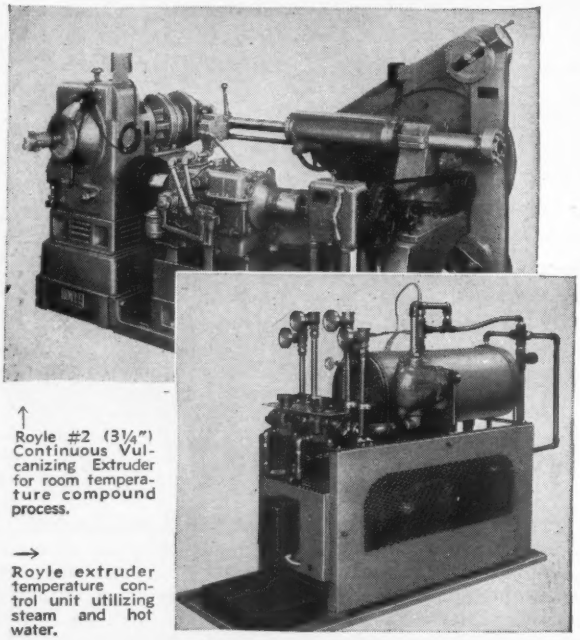
3908 FRANKFORD AVE. • PHILADELPHIA 24, PA.

Of Particular Importance

To the Wire Insulating Industry

The room temperature compound process and associated equipment recently developed by the Western Electric Company, Incorporated, offer nine important advantages. These advantages begin with the storage of completely mixed, ready-to-extrude, rubber, GR-S, or Neoprene compounds and extend to a smoother and improved appearance for the finished product.

The complete extruder vulcanizing portion of the room temperature compound process is available to insulated wire producers* from John Royle and Sons who, for seventy-two years, have been building extruding machines to meet the most exacting process requirements.



↑ Royle #2 (3¼") Continuous Vulcanizing Extruder for room temperature compound process.

→ Royle extruder temperature control unit utilizing steam and hot water.

CHECK THESE ADVANTAGES:

- Improved diameter control
- Reduction in compound scrap
- Reduction in electrical faults
- Permits storage of completely mixed compounds
- Permits more economical scheduling of mixing equipment
- Eliminates "warm-up" operation
- Possible mill-room economies
- "Hot" machines may be converted
- Finished product has smoother finish—better appearance

Licensees of Western Electric Company

JOHN ROYLE & SONS
10 ESSEX STREET, PATERSON 3, NEW JERSEY

struction equipment. In addition, DMPA's Mining Requirements Division assisted the American mining industry in obtaining approximately $50,000,000 worth of machinery and equipment on a day-to-day basis, Mr. Larson added.

★ ★ ★

Project by project, the Nation's industrial might is being brought into full play to meet the great challenge of our times. Where necessary, the Government is assisting in this great expansion program with floor-price purchase contracts, accelerated amortization arrangements and loans. And it has speeded agreed-upon projects with necessary priority ratings and directives to channel equipment and machinery to the places where they can do the most good. But the job itself is being done by industry, and that is the way the still bigger job that lies ahead will be done.

★ ★ ★

Iron ore topped the year's list in number of projects with a total of 96 for a production expansion of 30,736,140 tons per year.

★ ★ ★

The list of projects includes 53 for copper; 29 for the ferro-alloys (chromium, cobalt, manganese, molybdenum, and tungsten); 92 for lead, zinc and cadmium; five for tin, three for titanium; and 131 for a dozen or more non-metallic materials. The projects also include 23 that provide for improvement of existing aluminum plants. The defense Production Administration represents the Government in the main aluminum expansion program.

★ ★ ★

Other projects under consideration to expand production of iron ores, copper, titanium, manganese, tungsten and other metals and minerals will involve further large outlays by industry.

★ ★ ★

Contemplated expansion in the production of taconite alone will involve an investment of approximately a half-billion dollars. Taconite is low-grade iron ore of which there are virtually inexhaustible reserves in Minnesota.

Pending expansion in copper production in the United States will necessitate an outlay of approximately $150,000,000, and another $200,000,000 will go into additional facilities for production of titanium, manganese, tungsten and other metals and minerals needed to supply the country's defense needs and expanding economy.

★ ★ ★

The expansion program, however, is not confined to domestic producers. A number of foreign contracts to bring in additional supplies of strategic materials are being negotiated.

★ ★ ★

Whipple Jacobs

Whipple Jacobs, president, **Phelps odge Copper Products Corporation,** died suddenly on August 19th at his home in Pipersville, Pa. He was 55 years of age.

★ ★ ★

Formerly president of the Belden Manufacturing Company, Mr. Jacobs became president of Phelps Dodge Copper Products Corporation on January 1, 1949.

★ ★ ★

A veteran of the AEF in World War I, his business career prior to Phelps Dodge had been spent entirely with the Belden Manufacturing Company, where he started as a cost clerk in 1914.

★ ★ ★

Mr. Jacobs was born February 7, 1897 in Chicago, the son of William Vaughn and Mary Whipple Jacobs.

★ ★ ★

He was director of the National Association of Manufacturers, Phelps Dodge Copper Products Corporation, Chicago Railway Equipment Company, the Central Republic Company , and a trustee of the Illinois Institute of Technology.

★ ★ ★

He left the copper industry only once after he started in 1914 as cost clerk with the Chicago office of the Belden Manufacturing Company, makers of electrical wires, cables and cordage.

★ ★ ★

His early years with this company were in the factory, serving successively as chief inspector, foreman of a manufacturing department, general storekeeper, production manager and purchasing agent.

★ ★ ★

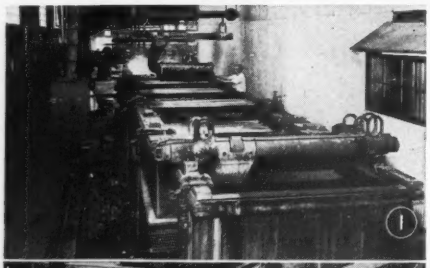
FOR SPECIALTY WIRES
A SPECIALTY MILL...

Johnson plants in Worcester, Akron and Los Angeles are specialty mills, equipped for the development of specialty wires. All wire drawn in these plants is always under strict laboratory control all the way from the basic material to finished product.

JOHNSON
JOHNSON STEEL and WIRE CO., INC.
Worcester 1, Massachusetts
New York Philadelphia Detroit Akron Chicago
Atlanta Houston Tulsa Los Angeles Toronto
SUBSIDIARY OF PITTSBURGH STEEL COMPANY

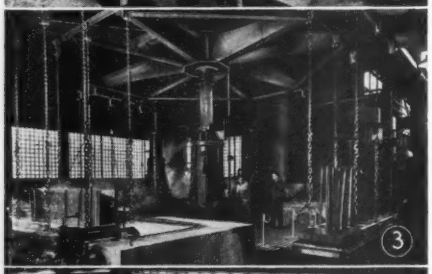
AMERICAN CHEMICAL PAINT COMPANY
AMBLER PENNA.

Technical Service Data Sheet
Subject: EFFICIENT PICKLING WITH RODINE®

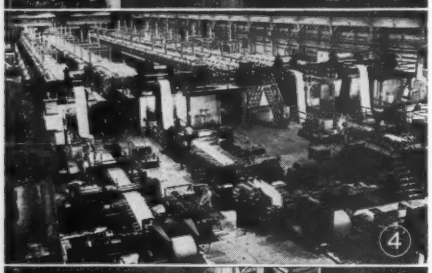


1. Rod and wire are pickled clean with "Rodine" without wasting either acid or metal. Breakage in drawing due to acid brittleness is minimized.

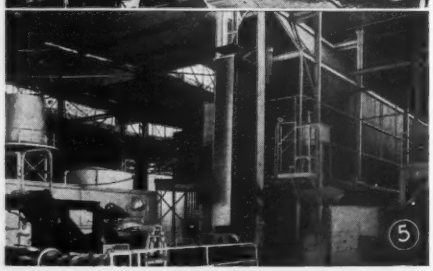
2. "Rodine" protects the exterior of tubes while completely descaling the interior and minimizes breakage in drawing due to acid brittleness.



3. "Rodine" makes possible the batch pickling of sheets over a wide range of acid concentration and temperature.



4. Whether sheet steel is pickled continuously or in batches, "Rodine" improves the surface and prevents "pickle burning" in prolonged pickling.



5. The absence of pitting and the smoother surface obtained with "Rodine" saves expensive coating metal in electrolytic tinning and galvanizing.

CHEMICALS ACP PROCESSES

WRITE FOR DESCRIPTIVE FOLDER ON "RODINE" AND INFORMATION ON YOUR OWN PICKLING PROBLEM.

CHEMICALS ACP PROCESSES

He became purchasing agent in 1923 and general sales manager in 1927 and vice president in charge of sales in 1930.

★ ★ ★

Having come up through the ranks in the company, he was the logical man for the presidency of this important wire company. He was elected president in 1939, an office he held through World War II, when Belden assumed an important role in supplying wire for the armed services.

★ ★ ★

His outstanding record with Belden made him the logical man when the Phelps Dodge Corporation searched the industry for a man to head its huge fabricating business, the Phelps Dodge Copper Products Corporation, with plants in Los Angeles, Fort Wayne, Elizabeth, N. J., and Yonkers, N. Y.

★ ★ ★

Mr. Jacobs became president of this corporation on January 1, 1949, two years later becoming chief executive officer as well.

★ ★ ★

New Paste Protects and Lengthens Life of Commutators

The Marine and Power Plant Service Division of **Magnus Chemical Co., Inc.**, Garwood, N. J., has been appointed by Long-Life New York as distributors of their product "Long-Life". Long-Life is a commutator and slip ring protector which extends the life of commutators, slip rings and brushes, a paste containing degummed castor oil, refined oils and tallows and copper dust in colloidal suspension.

★ ★ ★

When Long-Life is applied to commutators, slip rings and brushes it changes to an extremely hard film. Part of this film is picked up by the brush, or between the slip ring and brush. The film is oil and dustproof and its hardness eliminates stoning and cleaning.

★ ★ ★

It lengthens brush life by 100 to 300%. It insures a better commutation and increases the electrical efficiency by decreasing brush chatter, arcing and heating. No shutdown of equipment is required when Long-Life is applied.

★ ★ ★

Further information about this product may be obtained by writing to the Marine and Power Plant Service Division, Magnus Chemical Co., Inc., Department W&WP, Garwood, New Jersey.

★ ★ ★

Non Ferrous Wire Men Offered Unusual Program at Annual Convention

At the forthcoming Annual Convention of the **Wire Association** at Cleveland in November, a splendid program that will interest and benefit non-ferrous bare and insulated wire men has been put together by the Program Committee.

★ ★ ★

The complete program is printed elsewhere in this issue to provide you with a detailed description of the technical sessions and other activities. Go over it carefully. You will find much in it to warrant your attendance.

★ ★ ★

Besides members of the Wire Association, who may bring guests, other people who are engaged in non-ferrous wire work in our industry are cordially invited to attend the Convention, participate in its functions and learn how it works. If you like what you see and want to become a member of the Wire Association, application cards will be available at the registration desk.

★ ★ ★

To assure yourself of hotel accommodations, which must be made through the Association, you may write for a hotel reservation card, addressing it to 453 Main Street, Stamford, Conn. If you have not attended the meetings heretofore, we hope that you will honor us with your presence this year.

THESE 4 Solar COMPOUNDS ARE "Conditioned" for conditions!

BECAUSE both the angle of the glass braid, particularly on building wire and armored cable conductors, and the temperature conditions encountered during shipping, warehouse storage and installation have a direct bearing on the particular types of saturants and finishers used, it is important to your company that you are aware of the qualifications of various compounds.

Solarite KS-566 Saturating and KF-561 Finishing Compounds—used over all glass braided, rubber covered wire and non-metallic sheathed cable—are specifically designed to meet stringent conditions. They provide excellent moisture resistance, retain flexibility at low temperatures and prevent sticking in coils at extremely high temperatures.

For more normal conditions where extremities are not likely to be encountered, it is more practical and less expensive to apply Solarite KS-709 Saturating and KF-715 Finishing Compounds. These materials have excellent tank stability, operating characteristics and flame retardant qualities.

SPECIFICATIONS

Solarite KS-566 Saturating Compound	
Softening Pt.—(B & R)	140°F. Min.
Penetration @ 77°F., 100 gr., 5 Sec.	60-75
Stormer Viscosity @ 300°F. 100 Revolutions	85-110 Sec.
Specific Gravity @ 25°C.	1.00-1.04
Flash Pt.	500°F. Min.
Fire Pt.	600°F. Min.

Solarite KS-709 Saturating Compound	
Softening Pt.—(B & R)	120°F. Min.
Penetration @ 77°F., 100 gr., 5 Sec.	44-55
Viscosity, Stormer @ 300°F., 100 Revolutions	28-34 Sec.
Specific Gravity @ 25°C.	1.02-1.06
Flash Pt.	530°F. Min.
Fire Pt.	600°F. Min.

Solarite KF-561 Finishing Compound	
Softening Pt.—(B & R)	220°F. Min.
Penetration @ 77°F., 100 gr., 5 Sec.	14-16
Viscosity, Stormer—360°F.	3-10 RPM
Specific Gravity @ 77°/77°F.	1.02-1.06
Flash Pt.	Over 500°F.

Solarite KF-715 Finishing Compound	
Softening Pt. (B & R)	200°F. Min.
Penetration @ 77°F., 100 gr., 5 sec.	7-10
Viscosity, Stormer—36°F.	5-12 R.P.M.
Specific Gravity— 77°F/77°F.	1.02-1.06
Flash Pt.	500°F.

Note: Regardless of what combination is used, it is important that paint be used as an anti-stick.

The services of our technical staff are available to you without obligation.
For additional information, write Solar Compounds Corporation.

Solar Compounds Corporation
Solar Varnish Corporation
1213 WEST BLANCKE ST. · LINDEN, N. J.

Outstanding Personalities of the Wire Industry

Baker-Raulang Appointments

Appointment of **Hugh C. Seeley** to the position of Sales-Service Supervisor has been announced by **The Baker-Raulang Company.** At the same time, the appointment of **Walter E. Schoch** as Service Department Manager was announced.

★ ★ ★

Mr. Seeley's new duties will be the handling of all Government inquiries and quotations. He will also supervise the preparation of the many special components lists required by the various Government agencies and will recommend spare parts inventories for Baker customers.

★ ★ ★

Mr. Schoch will assume the responsibilities of personnel supervision in Baker's Service Department and will direct all Service Department activities with the exception of those now under Seeley's supervision.

Goodwin Joins Morrison Engineering

L. A. Davis, President of the **Morrison Engineering Corporation,** has announced the appointment of **John A. Goodwin** as General Manager. Mr. Goodwin is assisting Mr. Davis in all industrial sales operation and serving as engineering advisor. Effective immediately, Mr. Goodwin took over these new assignments early in July. He is located in the Cleveland plant of the Morrison Engineering Corporation.

★ ★ ★

Mr. Goodwin was previously with the Chase Brass & Copper Corporation where he worked for 15 years in the capacities of Products and Research Engineer, Sales Promotion Engineer and Chief Metallurgist of the Chase Brass & Copper War Production plant. He also has worked for six years with the North American Manufacturing Company as Field Engineer. Mr. Goodwin was born in Glasgow, Scotland, moved in 1921 to Cleveland, Ohio where he graduated from the Case Institute of Technology.

★ ★ ★

The Morrison Engineering Corporation manufactures all types of industrial ovens, billet casting, heat-treating, annealing and aluminum forging furnaces, rod and wire flash bakers, core and point ovens and finishing systems. The main office of the Morrison Engineering Corporation is located at 2222 Fairhill Road, Cleveland 6, Ohio.

R. B. Devine Promoted

R. B. Devine has been promoted to sales manager of the **B. Greening Wire Co. Ltd.,** Hamilton, Ont., succeeding **C. H. Carnahan,** who retired recently.

Glader—Years of Proven Performance
GLADER NAIL MACHINES
55 YEARS of experience meeting the exacting demands of nail making.
The machine with a record of steady dependable service.
Wm. GLADER MACHINE WORKS
210 N. RACINE AVENUE
CHICAGO 7, ILLINOIS
Export Dept.: 122 E. 42nd Street, New York 17, N. Y.

Hooker Organization Changes

Hooker Electrochemical Company has transferred two chemical engineers, **John T. Walmsley** and **Frederick W. Bonacher, Jr.**, to the sales coordination office of the Sales Department at Niagara Falls, N. Y.

★ ★ ★

John P. Edwards and **Carl I. Gochenour** from the Development and Research Department to the Sales Department of the firm. Both are assigned to new product development work in the Sales Development group.

★ ★ ★

Dr. Eugene T. Miller, a graduate of State Real Gymnasium, Real, Germany in 1942, who was a supervisor of research at the Hungarian American Oil Company until in 1944, has been added to the technical staff.

★ ★ ★

Alfred W. Toon has been engaged as a designing engineer. His experience covers a number of years as draftsman, maintenance engineer, structural engineer and plant engineer in chemical, paper and metallurgical industries.

★ ★ ★

Herbert K. Holden has been made sales representative in the Niagara sales territory, which comprises western Pennsylvania and New York State exclusive of the metropolitan area.

Keystone Promotes Two Men

Promotion of **J. O. Tompkins** and **Harold Fales** has been announced by **R. S. Simmons**, chief metallurgist, **Keystone Steel & Wire Company.**

★ ★ ★

Mr. Tompkins has been appointed assistant chief metallurgist. He will be responsible for the maintenance and improvement of quality of the steel and wire products in the steel plant and wire mill.

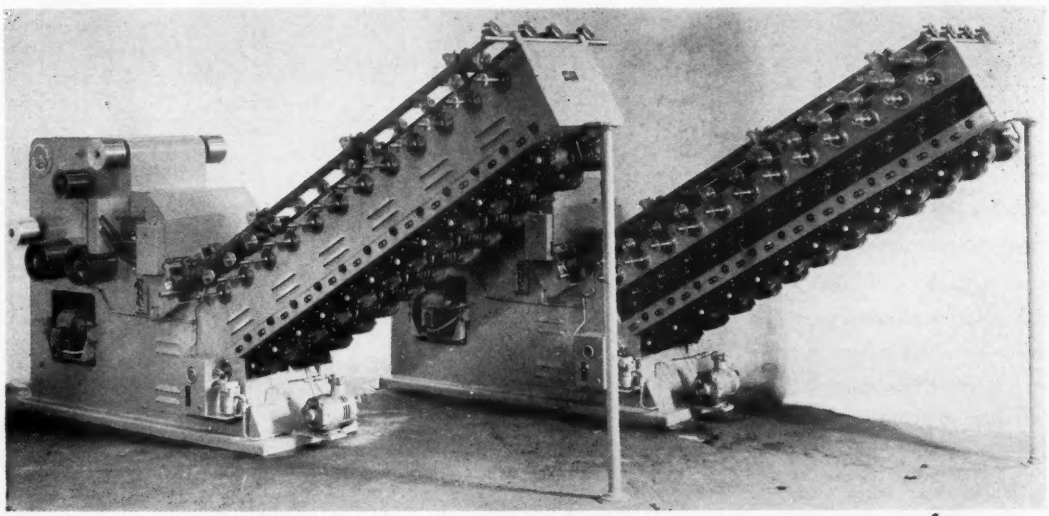
★ ★ ★

Mr. Fales has been designated wire mill metallurgist. He will be in charge of quality control of wire and wire products.

Reliance Adds Four Engineers

Addition of four engineers to the Cleveland, New York, Buffalo, and Chicago district sales offices respectively of the **Reliance Electric & Engineering Company,** manufacturers of electric motors and motor drives, is announced by **E. E. Helm**, sales vice president. The appointments become effective immediately. They are: **James McCrea Biggar,** Cleveland District Sales Office, 13967 Cedar Road. He reports to **W. W. Spanagel,** Cleveland district manager, **Burton B. Finigan,** New York District Sales Office, 420 Lexington Avenue, reporting to **C. D. Herbert,** New York district manager, and **Walter A. Jensen,** who goes to the Buffalo District Sales Office, 4405 Ellicott Square Building. He reports to **C. B. Allen,** Buffalo district manager. **William C. Prettyman,** to the Central Western District Sales Office, 154 E. Erie Street in Chicago, reports to **R. O. Herbig,** Central Western district manager.

★ ★ ★



AN ORDER OF 24 LINE INCLINED TAKE-UP SPOOLERS

VARIABLE SPEED DRIVE TO CAPSTANS AND TRAVERSE.
INDIVIDUAL TORQUE MOTOR DRIVE TO EACH SPOOL SPINDLE.
LUBRICATION BY MEANS OF ALEMITE OIL-MIST.

WIRE DRAWING, ENAMELING, TINNING,
INSULATING, TAPING, GLASS-COVERING,
PANNING AND ALLIED MACHINERY.

EST. 1855 AIMCO INC. 1915

"American" INSULATING MACHINERY COMPANY

REG. U.S. PAT. OFF.

FAIRHILL AND HUNTINGDON STREETS

PHILADELPHIA 33 PENNSYLVANIA U.S.A.

New Works Manager at C.F.&I's Buffalo Plant

Appointment of **A. E. Giblin** as works manager of **CF&I's Wickwire-Spencer steel division** in Buffalo, N. Y., has been announced by **Jay J. Martin,** CF&I vice president of operations.

★ ★ ★

A native of Buffalo, Mr. Giblin entered the steel industry at an early age. As a young lad he worked at Bethlehem Steel's Lackawanna plant, where his father, John Giblin, is a veteran steelworker and mason supervisor.

★ ★ ★

After "Al" learned his trade he served at Republic Steel in Alabama, returning to Buffalo in the summer of 1946 to become mason superintendent for the Wickwire-CF&I mills.

★ ★ ★

Mr. Giblin advanced to assistant plant manager of the Buffalo steel mills in June 1949, and became works manager following the recent resignation of **Carl J. Murray.**

★ ★ ★

The new Buffalo works manager lives with his family at 89 Huxley Drive in nearby Snyder, N. Y.

Canadian Firm Opens New Plant

A new plant for the manufacture of Speed Nut fasteners in Canada was recently opened by **Dominion Fasteners, Ltd.,** in Hamilton, Ont.

Elects Vice President

Ian F. McRae was recently elected vice president of manufacturing, **Canadian General Electric Co. Ltd.,** Toronto, Ont.

Made Assistant General Manager

William U. Cigliano was recently appointed assistant general manager, Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.; **Russell Hoehl,** appointed assistant district manager, Philadelphia office; and **Vernon Paulson,** named assistant Western sales manager, Chicago office.

Joins Sales Staff of Apco-Mossberg

Gerald F. McNally has been added to the sales organization of the **Apco-Mossberg Company,** Attleboro, Mass., to assist **J. G. McGreevy,** Vice President, in the handling of reel and spool sales throughout the country.

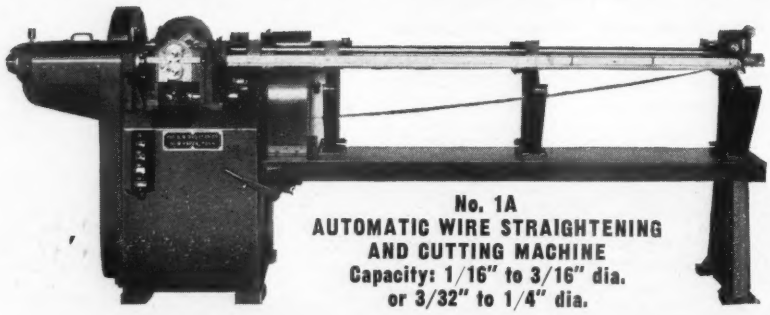
★ ★ ★

Mr. McNally, known to his friends as "Jerry", after a period of service in the Navy, entered Boston College, from whence he graduated in 1950 with a Bachelor of Science degree. He was called back into Navy service after graduation, but joined the Apco-Mossberg organization in November, 1951. During his school days and for the past six months he worked in the spool and reel manufacturing end of the business, which has given him a good basic knowledge of spool and reel types for his sales work.

★ ★ ★

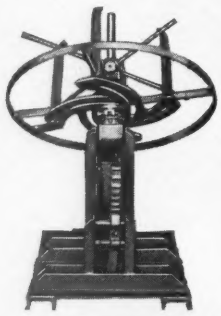
Jerry will, along with the other Jerry (McGreevy) be calling on the wire industry. The two Jerries should make an unbeatable team.

A "SHUSTER" *automatically* boosts production in wire-using plants!



No. 1A
AUTOMATIC WIRE STRAIGHTENING AND CUTTING MACHINE
Capacity: 1/16" to 3/16" dia. or 3/32" to 1/4" dia.

Wherever a Shuster is installed, production increases as high as 75 percent have been recorded. Shusters take wire from coil stock, then straighten and cut it to accurate lengths, all in a smooth, precision operation noted for the almost continuous wire travel. Once set, Shusters require little attention beyond keeping them supplied with coils. Sizes available for .025" to 11/16" dia. wire; shapes, flat stock, tubing. Write us your requirements.



SHUSTER WIRE REELS
The counterbalancing weight does practically all the lifting, permitting one man to raise the heaviest coils of wire to the operating position.

Mfd. by **METTLER MACHINE TOOL, INC.**
132 W. Lawrence St., New Haven, Conn.
Representatives in all principal cities and in foreign countries.

SHUSTER . Since 1866
Automatic WIRE STRAIGHTENING AND CUTTING MACHINES

Carl A. Porath, CF&I Engineer, Dies

Carl A. Porath, former **Colorado Fuel & Iron Corp.,** engineer, died recently. Mr. Porath designed and remodeled many of the wire fence machines currently used in the steelmills. He was 78 years old when death came.

★ ★ ★

Prior to his retirement in 1948 after 20-years of service at the Minnequa plant, Mr. Porath remodeled many machines at the wire mill and built the ornamental fence machines in operation there at the time he ceased active work at the steelworks.

★ ★ ★

A native of Sweden, Mr. Porath came to Pittsburgh, Pa., in 1893 following apprenticeship at the oldest steelmaking concern in the world, founded in 1224.

★ ★ ★

He first started designing fence machinery at the American Steel and Wire Co., and later built plant equipment for the Youngstown Sheet and Tool Co.

★ ★ ★

While at the Continental Steel Co. in Kokomo, Ind., Mr. Porath constructed the first fully automatic ornamental fence machine.

★ ★ ★

Baker-Raulang Appoints Erie Distributor

Appointment of **Erie Equipment Company,** 1628 High Street, Erie, Pennsylvania as industrial truck sales representative in the Erie area was announced recently by The Baker-Raulang Company.

★ ★ ★

L. A. Jensen, owner of Erie Equipment, will direct the sales and service of Baker fork trucks, platform trucks and cranes in this area, which includes the north-western Pennsylvania counties of Erie, Crawford, Warren, McKean and Potter.

Townsend Man Joins Controllers Institute

Dante C. Fabiani, controller, Townsend Company, New Brighton, Pennsylvania, has been elected to membership in the Controllers Institute.

★ ★ ★

Established in 1931, the Institute is a non-profit organization of controllers and finance officers from all lines of business. The total membership exceeds 3,800.

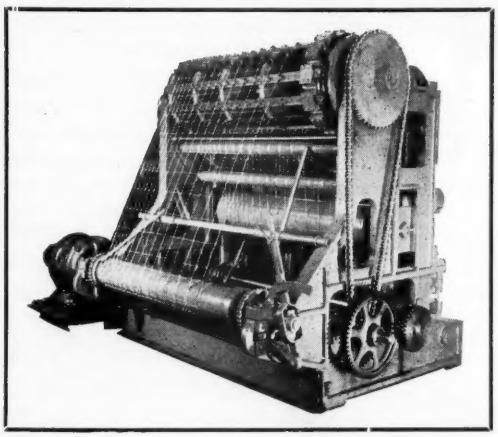
Dr. Engle Becomes Works Chemist for Hooker

Hooker Electrochemical Company has promoted **Harvey R. Engle** to Works Chemist of the Works Laboratory, a position formerly held by **Burr H. Ritter,** recently retired.

★ ★ ★

Dr. Engle came to the Hooker Company and the Works Laboratory as an assistant in 1939. He received an AB in 1932 at Hiram College, an MA at Boston University in 1934 and a PhD at Cornell University in 1939.

INTERLOCKING FENCE LOOMS



- Fastest — Most Efficient
- Preferred by Leading Mills
- Low Maintenance Cost.
- Wrapped Stay Fence
- Straight Stay Wires
- Integrated — Space Saving.
- Replaceable Main Bearings.
- Single or Double Strands.
- Years of Low Cost Production.

Write for Detailed Information — Without Obligation

Interlocking Fence Co., Dept. L, Morton, Ill.

Specialists In Fence Looms

Charles Carl Carr

Charles Carl Carr, who retired in 1949 as director of public relations and advertising for **Aluminum Company of America** died suddenly on Tuseday, July 29, of a heart attack, in St. Petersburg, Florida, where he has resided since his retirement.

★ ★ ★

Mr. Carr began his career with ALCO in 1934 as advertising manager. He was made director of public relations and advertising in 1944. Since his retirement, he has been a public relations consultant at St. Petersburg. He is the author of "ALCO: An American Enterprise" and co-author of "The Story of Panama." At the time of his death he was working on a book to be titled, "Retirement in Florida."

★ ★ ★

Made Electrical Engineer by Hydropress

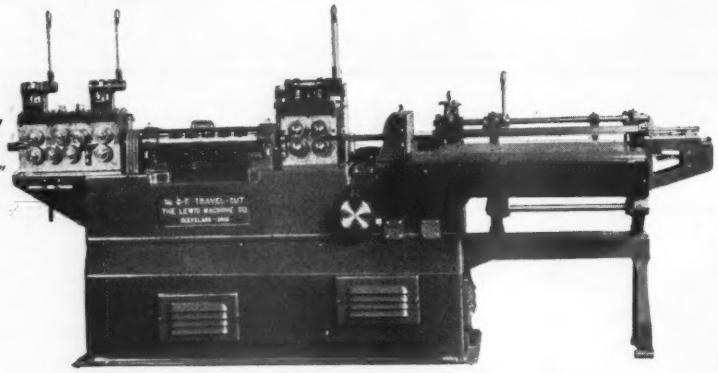
George N. Landis, D.E.E., has been appointed Chief Electrical Engineer of the newly created **Electrical Department of Hydropress, Inc.,** New York, and its Loewy Rolling Mill Division. Mr. Landis has been connected with the organization since 1942.

★ ★ ★

Fast, Accurate, Economical

STRAIGHTENING and CUTTING

with LEWIS **TRAVEL-CUT**



22 Models to handle from 1/16" to ¾" Round, Hex, Flat, Shapes.

Simple in design, rigid in construction, Lewis TRAVEL CUT will deliver continuous dependable service under the most severe, high production conditions—day in, day out. Feeds wire from the coil, straightens accurately, gauges to uniform length, and cuts clean without stopping the wire. For steel, brass, aluminum and alloy wire. Cut your cutting costs with the Lewis TRAVEL CUT. Full details on request.

Exclusive Representatives

EAST: Penn Machinery Co., 117 North Third Street, Philadelphia 6, Penn.

MIDDLE WEST: Steel & Wire Machinery Co., 15457 Euclid Ave., Cleveland 12, O.

CENTRAL: Moslo Machinery Co., 2443 Prospect Avenue, Cleveland 15, Ohio.

WEST COAST: Hoffman & Heartt, 3005 So. Grand Ave., Los Angeles 7, California

CANADIAN: Empire Engineering Co., 11 Wellington St. E., Toronto 1, Ontario.

CONTINENTAL EUROPE: Gaston E. Marbaix Ltd., Devonshire House Vicarage Crescent, London S. W. 11, England.

The LEWIS MACHINE Company

3441 E. 76th Street, Cleveland 27, Ohio

Also agents in Paris, Stockholm, Rotterdam, Brussels, Zurich, Milan, Bombay and Melbourne

Anaconda Advances Three Men

H. Donn Keresey, President of the **Anaconda Wire & Cable Company,** New York, N. Y., announced at a recent meeting that the Board of Directors of the Company appointed **R. B. Steinmetz,** Vice President in Charge of Manufacturing Operations, and **L. R. Love,** Vice President in Charge of Sales.

★ ★ ★

Mr. Steinmetz was formerly General Manager of Mills, and Mr. Love, General Sales Manager.

★ ★ ★

The appointment of D. E. Allen as General Sales Manager to succeed Mr. Love was also announced.

★ ★ ★

Research Company Establishes Washington Office

Dr. Johan Bjorksten, President of Bjorksten Research Laboratories, has announced that his firm has established an office in Washington, D. C., principally as a center for literature research in the libraries of the Patent Office, the Library of Congress, and other Washington depositories.

★ ★ ★

The office is under the direction of **James W. Perry,** Director of Literature Research of the Bjorksten Research Laboratories. **Henry C. Tovey** is attached to the Washington office as literature chemist.

★ ★ ★

Mr. Perry is a past chairman of the American Chemical Society's Division of Literature Chemistry, and is now serving on various American Chemical Society Committees. He is the author of several books, among which is a recent book on punch cards and mechanical aids in chemical literature searching.

★ ★ ★

Named Michigan District Manager For Carboloy

Appointment of **V. H. Dearle** as Manager, Michigan District with headquarters at 11177 East 8 Mile Road, Detroit, has been announced by F. J. Staroba, Manager-Field Sales, **Carboloy Department of General Electric Company,** Detroit 32, Michigan, manufacturer of specialized metals and cemented carbide tools for the metalworking industry.

★ ★ ★

Mr. Dearle joined the Carboloy organization in 1928, became a Sales Engineer in the Michigan District in 1931. Since 1937 Mr. Dearle has been Assistant Manager of the Michigan District.

★ ★ ★

In his new position, Dearle succeeds **E. R. Almdale,** who has been made Manager of the Atlantic District for the Carboloy Department, with offices at 1060 Broad St., Newark 2, N. J.

★ ★ ★

Collins Made Executive VP by Glass Fibers

Thomas A. Collins has been elected to the newly-created position of Excutive Vice President of **Glass Fibers Inc.,** at a recent meeting of the company's Board of Directors. This announcement was made by the company president, **Randolph H. Barnard.**

★ ★ ★

Mr. Collins has spent his entire business career in the glass and glass fiber industry. He began with Owens-Illinois in 1926 as supervisor of mold manufacturing. From 1932 to 1934 he was with the engineering department of the Industrial Materials Division, forerunner of Owens-Corning Fiberglas Corporation, then, progressively was manager of the Gas City, Indiana plant; Western glass container factories manager; general factories manager of the Libbey Division and then Kaylo Division of Owens-Illinois.

★ ★ ★

He will headquarter at Glass Fibers' home office in Toledo.

★ ★ ★

Presented with Advertising Award

Roger T. Lyman, general advertising manager, **The Torrington Manufacturing Co.,** Torrington, Conn., recently accepted a citation in the Annual Putman Awards from **Col. Russell L. Putman,** president of the **Putman Publishing Co.,** Chicago, originator of the awards for advertising effectiveness judged by executive management of industry. The presentation was made at the 30th annual conference of the National Advertisers Assn., Chicago. The citation was a joint one for the Torrington agency. **Edward Graceman & Associates,** Hartford, Conn.

★ ★ ★

Kenmore Metals Appointment

Paul E. Chisler is now in charge of manufacturing procedures of the new stainless steel division of **Kenmore Metals Corporation,** Jersey City, N. J.

★ ★ ★

He was at one time Chairman of the Carbon Wire Specification Committee of A.S.T.M. and associated with Page Steel & Wire Division of American Chain & Cable Co. Monessen, Pa. as Plant Metallurgist, and Ivy H. Simith Co., Jacksonville, Florida as Vice President in charge of operation of the wire and wire fabric mill. He is a member of The Wire Association.

★ ★ ★

Mid-States Executive Made V. P. of Controllers Institute

Gregory M. Layne, controller, **Mid-States Steel & Wire Company,** Crawfordsville, Ind., has been elected vice president of the Indianapolis Control of the Controllers Institute.

★ ★ ★

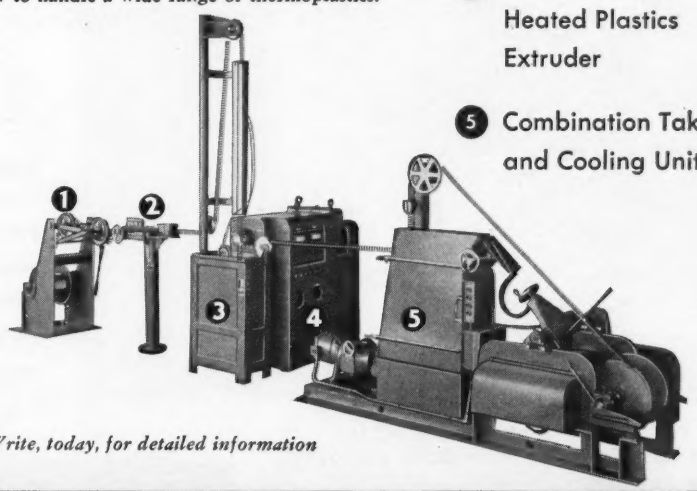
NRM

COMPLETE EQUIPMENT FOR COVERING WIRE WITH NYLON . . . . . .

Here's a "straight-line" production unit especially designed to give you faster, better covering of wire with Nylon. From the sturdy supply stand to the combination take-up and cooling unit, this NRM equipment is tailor made to give you the maximum output of accurately centered, smoothly covered wire at a minimum of cost and maintenance. A special metering type "torpedo" feed screw, a special Nylon crosshead, and extremely uniform heating are combined in a rugged 1½" electrically heated extruder to eliminate "pulsation" and to cover small gauge wire at high speeds and to close tolerances.

What's more, with a few simple changes this same equipment can be used with other wire covering plastics. The extruder, with built-in "Balanced Heat Control", need only be fitted with a different feed screw to handle a wide range of thermoplastics.

1. Supply Reel Stand
2. Wire Straightener
3. Vertical Wire Preheater and Cooling Tank
4. 1½" Electrically Heated Plastics Extruder
5. Combination Take-up and Cooling Unit



Write, today, for detailed information

2012

NATIONAL RUBBER MACHINERY CO.

General Offices & Engineering Laboratories: Akron 8, Ohio
East: 1180 Raymond Blvd., Newark, N. J.
West: S. M. Kipp, Box 441, Pasadena 18, Cal.
Export: Omni Products Corp., 460 Fourth Ave., New York 16, N. Y.

Creative Engineering

Mid-States Executive Made V. P. of Controllers Institute

Gregory M. Layne, controller, **Mid-States Steel & Wire Company**, Crawfordsville, Ind., has been elected vice president of the Indianapolis Control of the Controllers Institute.

★ ★ ★

At the annual meeting of the organization's Detroit Control, **Arthur W. Ackerman**, secretary and treasurer, L. A. Young Spring & Wire Corp., was named a director. **Russell M. Braund**, comptroller, American Steel & Wire Division of United States Steel Co., has been similarly honored by the local controllers' group in Cleveland.

★ ★ ★

A. S. T. M. in New York Re-Elects Jones Secretary

A. A. Jones has been re-elected to the post of secretary of the New York District Council of the A. S. T. M. Mr. Jones is manager of the Engineering Department at the Hastings-on-Hudson plant of the Anaconda Wire & Cable Co. He had served previously for a 2-year term as secretary of the Council.

★ ★ ★

Mr. Jones also has been re-elected secretary of the A. S. T. M. Committee B-1, on Wires for Electrical Conductors.

★ ★ ★

C. A. Litzler, President of Industrial Ovens, Inc. to Tour European Rubber Industry

C. A. Litzler, president of **Industrial Ovens, Inc.**, sailed on August 20th on the Ile d'France for a two-month tour of Italy, France, Germany, Holland, Belgium and England to discuss tire cord processing systems with over 40 leading manufacturers in Europe.

★ ★ ★

The business trip is a follow-up of a similar tour made last year by Mr. Litzler. Inspection of Industrial Ovens' installations currently operating in Europe will be included in Litzler's itinerary.

Industrial Ovens, Inc., 13825 Triskett Rd., Cleveland 11, Ohio, designs, manufactures and installs continuous materials handling and processing systems—with the engineered application of heat—for the rubber, plastics, paper, textile, film and wire industries.

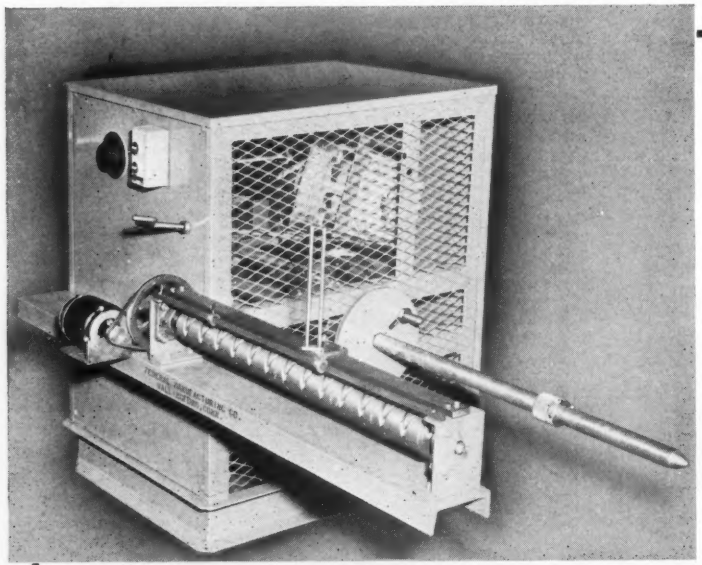
★ ★ ★

Mr. Litzer will make his first stop at Pirelli, S.p.A., Milan, Italy, and will visit other large manufacturers of rubber products throughout Europe. He will be accompanied by Mrs. Litzler and their daughter, Jane. They will return on the Liberte which sails from Southampton, England, on October 8th.

★ ★ ★

Non-Ferrous Division Holding Waterbury Meeting

September 19th at the **Elton Hotel** there will be a meeting of the Non-Ferrous Division of the **Wire Association.** All non-ferrous and electric wire men are welcome to attend.



In Your **FEDERAL TAKE-UP EQUIPMENT**

you will find no inflation in prices and no deflation in quality.

Equipped with variable torque controls. Have wide range of speeds—up to 2500 F.P.M. Heavy steel frame and precision construction makes for smooth operation and long dependable service. FEDERAL TAKE-UPS *are the most efficient machines made.*

Write today for literature and prices.

FEDERAL EQUIPMENT

- CAPSTANS
- PAY-OFFS
- SINGLE & DOUBLE TAKE-UPS
- ELECTRODES
- LACQUER TOWERS
- CORD SET TESTERS
- SPECIAL TESTING EQUIPMENT
- MEASURING MACHINES
- SPARK TESTERS

Federal Manufacturing Co.

SPECIAL WIRE MACHINERY

236-240 Hall Avenue, Wallingford, Conn.

A Review of Recent Wire Patents

No. 2,601,709, RESILIENT CONNECTOR, patented July 1, 1952 by Frederick O. Reichardt, Columbus, Ohio.

The connector is constructed of looped wire lengths and employed for securing together the ends of wires.

★ ★ ★

No. 2,601,769, CROCHET HOOK, patented July 1, 1952 by Esther R. Visconti, South Weymouth, Mass.

This hook is formed of heavy wire having a rounded handle, a flattened finger-grip and a hook. The finger-grip is an enlargement bent on one side only from the axis of the handle and has an elliptical opening.

★ ★ ★

No. 2,602,218, DOUBLE-ACTION CAN OPENER AND BOTTLE CAP REMOVER, patented July 8, 1952 by Herman Schmitt, Sheboygan, Wis.

A single length of rigid wire is employed to provide this device including the cutter element.

★ ★ ★

No. 2,602,454, EXTRACTOR DEVICE FOR PIPE CLEANERS, patented July 8, 1952 by Charles Wilfred Hewitt, Heswall, England.

This extractor is formed of a single length of wire. There are eleven claims.

★ ★ ★

No. 2,602,942, NAIL PACKAGING MACHINE, patented July 15, 1952 by Stuart Otto, Westport, Conn.

This machine employs electro-magnetic means for paralleling the nails and then permitting them to drop by gravity into a container while in parallelism.

★ ★ ★

No. 2,603,428, WIRE FEED MACHINE, patented July 15, 1952 by Frank A. Newcombe, Nutley, N. J., assignor to Westinghouse Electric Corporation, East Pittsburgh, Pa., a corporation of Pennsylvania.

Wire is fed from a supply spool which is directly driven by a motor. The wire extends to a pulley, mounted on a carriage having a vertically reciprocating motion, and from there the wire extends to a using machine.

★ ★ ★

No. 2,603,247, SPRING FORMING APPARATUS, patented July 15, 1952 by Kurt F. Semisch, Holyoke, and Adelard J. Belisle, South Hadley Falls, Mass.

Apparatus is provided for forming from spring wire a longitudinal spring having longitudinally spaced transverse portions with successive pairs thereof joined by loops at opposite ends.

★ ★ ★

No. 2,603,438, IRON HOLDER, patented July 15, 1952 by James L. Adams, Euclid, Ohio.

The holder is constructed of several strands of stout wire.

★ ★ ★

Complete Description and Drawings of Patents May Be Had for 50 cents, outside the United States and Canada $1.00. Address, Wire & Wire Products, 453 Main St., Stamford, Conn.

No. 2,603,536, WIRE DRAWN BRUSH MACHINE, patented July 15, 1952 by Richard B. Wilson, Springfield, Mass., assignor to Better Brushes Inc., Palmer, Mass., a corporation of Massachusetts.

There are 10 claims to this machine for making brushes of the wire drawn type.

★ ★ ★

No. 2,603,684, METAL SHEATHED ELECTRIC CABLE HAVING HEAT-REFLECTIVE LAYER, patented July 15, 1952 by Edward Percy Holmes, Steeple Aston, England, assignor to Super Tension Cables Limited, Glasgow, Scotland, a company of Great Britain.

About the insulated wire conduct is an outer sheathing of metal having a melting point much higher than the melting point of conventional lead sheathing in circumferentially spaced relation to the insulation; and a layer of metal interposed between the insulation and the sheathing at one surface in intimate continuous contact with the isulation and its opposite surface being heat-reflective and having means maintaining the insulation and the sheathing in spaced relation to provide air spacing between the heat reflective metal and the sheathing, this air spacing enabling the heat reflective property of the metal to be effective.

★ ★ ★

No. 2,603,688, APPARATUS FOR MEASURING WIRE AND THE LIKE, patented July 15, 1952 by Robert J. Cole, Yardley,

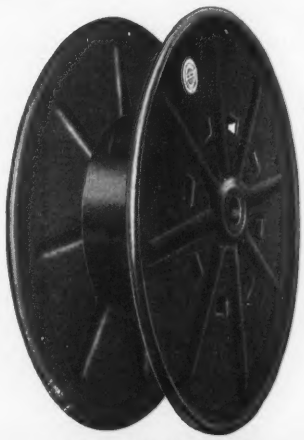
MOSSBERG **PRESSED STEEL** CORP.

Greater service from a new **ALL WELDED STEEL TAKE OFF REEL** designed to meet present day requirements.

Usual maintenance expense eliminated by adoption of this new design wherein all parts are welded into one homogeneous unit.

Reel sides are embossed with radial reinforcing ribs for increased rigidity with rolled edges for additional strength and to facilitate handling.

Complete line of spools and reels for both processing and shipping all kinds of bare and insulated wires and cables.



All Welded Steel
Take Off Reel

MOSSBERG
Pressed Steel Corp.
18 WEST STREET
ATTLEBORO, MASSACHUSETTS, U. S. A.

Telephone:
Attleboro
1-0847 & 1-0848

James Day (Machinery), Ltd., 28 Maddox Street, London WI, England

102

Pa., and Edward M. Yard, Trenton, N. J., assignors to John A. Roebling's Sons Company, Trenton, N. J., a corporation of New Jersey.

Electro-magnetic means is provided to measure rapidly moving lengths of wire without touching the wire.

★ ★ ★

No. 2,603,846, LINE-ATTACHED CLOTHESPIN, patented July 22, 1952 by William C. Styles, Steppville, Ala.

The clothespin is of the type adapted to be permanently affixed to the clothesline, and is constructed of a single length of wire.

★ ★ ★

No. 2,604,202, COIL SPRING PRODUCING MACHINE, patented July 22, 1952 by William E. Wunderlich, Muncie, Ind., assignor to Wunderlich Spring Machinery Company, a corporation of Illinois.

A transfer mechanism for transferring coil springs successively between a number of locations in a coil spring producing machine is provided and comprises, a rotatable carrier, a number of radially extending spring gripping arms pivotally carried by the carrier and each provided with cam followers, a cam engaging the cam followers for maintaining the arms in the plane of rotation and for pivoting the arms out of the plane of rotation, and a device to rotate the rotatable carrier and oscillate the cam in timed relation.

★ ★ ★

No. 2,604,288, COLLAPSIBLE WIRE BASKET, patented July 22, 1952 by Roderic M. Koch, Evansville, Ind.

A wire frame is provided for retaining a jar or the like for flowers.

★ ★ ★

No. 2,604,509, NONSPINNING ARMORED ELECTRIC CABLE, patented July 22, 1952 by Andre Blanchard, Houston, Tex., assignor to Schlumberger Well Surveying Corporation, Houston, Tex., a corporation of Delaware.

This cable comprises a non-load carrying, deformable core, an even number of concentric, helically wound load supporting layers of armor surrounding the core, alternate layers being wound in opposite directions with the outer layers having slightly greater lay angles than the inner layers, and the total cross-sections of alternate layers of armor being approximately in inverse ratio to the radii of said alternate layers of armor, such that the torques and stresses in the lavers of armor are equalized when the cable is under load.

★ ★ ★

No. 2,604,624, NAIL DISTRIBUTOR, patented July 29, 1952 by Wallace M. Cutler, Gloucester, Henry B. Greenough, Beverly, and Edwin S. Kant, Melrose, Mass., assignors to United Shoe Machinery Corporation, Flemington, N. J., a corporation of New Jersey.

This machine comprises a yieldably supported nail carrier movable in a horizontal path, a powered unit which is mounted in the carrier and comprises a member displaceable generally lengthwise of this path, and a resisting element which is operatively connected to the member, the carrier being movable lengthwise of the path in response to movement of the member.

★ ★ ★

No. 2,604,679, CHAIN FASTENER, patented July 29, 1952 by Frank Geiman Gise, York, Pa., assignor to The McKay Company, Pittsburgh, Pa., a corporation of Pennsylvania.

The fastener for two adjacent chain ends is constructed of rod or heavy wire material.

★ ★ ★

No. 2,604,883, WIRE SAW STRAND AND METHOD OF MAKING THE SAME, patented July 29, 1952 by Pierre de Vitry D'Avaucourt, Bainbridge, Pa.

A saw strand for use in loose abrasive sawing is provided comprising a number of wires, two at least of which are of the same size and are interwound helically around each other along a common axis to form intertwined convolutions the diameter of the helix of one of these two wires being greater than the diameter of the helix formed by any other wire, the convolutions of the larger helix being spaced apart to increase the abrasive carrying capacity of the strand.

★ ★ ★

No. 2,604,989, SCREEN, patented July 29, 1952 by Peter Warhol, Minneapolis, Minn., assignor, by mesne assignments to Midland Engineering Company, St. Paul, Minn., a corporation of Minnesota.

This screen comprises a multiplicity of sinous wires disposed in a common plane and definite openings for the passage of material, each of the wires having a succession of alternating, oppositely bent portions the convex sides of which are disposed closely adjacent the convex sides of the adjacent wires to form between each wire and each of the adjacent wires a row of separate openings for the passage and sizing of material, and fastening means connecting the wires together at intervals spaced longitudinally thereof to leave a multiplicity of the openings between adjacent fastening means.

★ ★ ★

No. 2,605,052, METHOD OF AND APPARATUS FOR COILING FILAMEN-

A SPECIAL INVITATION

is extended to all persons concerned with the manufacture of electric wire and cable to attend the annual convention of The Wire Association in Cleveland in November. Full details of what the Convention program offers you will be found in the four pages starting with page 884.

Please turn to these pages and study this fine program. If you are not a member of the Wire Association you will not have received a hotel reservation card. Please write for one today.

Do not ask for suites as these were entirely sold out in August. Only single and double rooms are now available.

THE WIRE ASSOCIATION

Richard E. Brown, Executive Secretary

453 MAIN STREET **STAMFORD, CONN.**

TARY ARTICLES, patented July 29, 1952 by George E. Henning and Charles J. O'Leary, Baltimore, Md., assignors to Western Electric Company, Incorporated, New York, N. Y., a corporation of New York.

There are twenty-four claims, including method claims covering advancing a filamentary article from a supply thereof along a pre-determined path of travel, normally coiling the articles at the end of its path of travel into coils each having a predetermined length, terminating the coil in process when the supply is exhausted and the coil has at least a predetermined minimum length, and continuing the coil in process when the supply is exhausted and the coil has less than the predetermined minimum length until the coil has increased an additional predetermined length.

★ ★ ★

No. 2,605,099, RUBBER-METAL SPRING, patented July 29, 1952 by Roy W. Brown, Akron, Ohio, assignor to The Firestone Tire & Rubber Company Akron, Ohio, a corporation of Ohio.

The spring comprises an outer envelope of rubber-like material, parallel ribs extending inwardly from the inner wall of the envelope and defining a helically arranged channel having two flat sides and a flat bottom, and a helical, metal spring of quadrilateral section engaged in the channel.

★ ★ ★

No. 2,605,201, WIRE TIRE FABRIC AND CABLE, patented July 29, 1952 by Harold S. Howe, Detroit, Mich., assignor to United States Rubber Company New York, N. Y., a corporation of New Jersey. This invention covers a number of cables, each cable comprising a number of steel strands cabled together and being brass coated on the exterior surfaces thereof for adhesion to rubber stock, part of the interior steel surfaces being uncoated, one of the interior strands of the cable being zinc coated to prevent corrosion of the one strand and the adjacent uncoated surfaces of the remaining strands, and a layer of rubber stock bonded to and enclosing the cables.

★ ★ ★

New Fellowship Fund Established By Westinghouse

A fellowship fund to help promising young engineers and scientists of the Westinghouse Electric Corporation continue their studies at a graduate level has been established in honor of the late **Leon R. Ludwig**, outstanding inventor and Westinghouse engineering executive.

★ ★ ★

Announcement of the education trust was made by A. C. Monteith, Westinghouse vice-president in charge of engineering, who also is a member of the Fellowship Committee which will administer the Fund. The Fund was established by Mr. Ludwig's widow, Mrs. Agnes S. Ludwig and daughter, Martha, at the time of the Westinghouse executive's death November 14, 1951, at the age of 47.

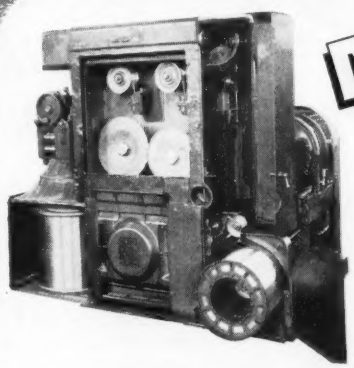
★ ★ ★

A prolific inventor, he had more than 70 patents to his credit. One of his most outstanding achievements in the field of electrical engineering was the development in collaboration with Dr. Joseph Slepian of the ignition rectifier—an ingenious electronic device now widely used in the mass production of aluminum and countless other industrial applications. As a simple, compact means of converting alternating current electricity to direct current, the ignitron tube has most recently made possible the revolutionary "ignitron rectifier locomotive." Two such electric locomotives have just been put into service by the Pennsylvania Railroad.

Mr. Ludwig joined the Westinghouse graduate student training course following his graduation in 1925 and rose rapidly through the Company's engineering ranks. He directed the development of the "Life-Line" electric motor now produced at the firm's Motor and Control Division in Buffalo, N. Y., and was the first manager of that major Westinghouse plant.

★ ★ ★

To be eligible for a Fellowship, a candidate must have shown marked ability in engineering or scientific fields and must be a Westinghouse employe of at least two years' service.



NOPCO'S **DURPON*** Drawing Compounds give **2-TIMES MORE SERVICE** than conventional compounds

Nopco's DURPON series of drawing compounds has been specially developed—after many years' research in the wire drawing field—for wet drawing nonferrous wire, rods, and tubes.

Incorporated into each Durpon product is a stabilizing additive which prevents contamination of the effective drawing ingredients by dirt, metallic particles, and carried-over acid. The additive preserves stability and lengthens the life of the drawing emulsion during recirculation. It also maintains a normal balance between soap and lubricant.

Nopco® Durpon compounds not only provide optimum lubrication, but retain their initial degree of performance for *twice as long* as conventional compounds. *Thus greatly increased die-life is assured.*

If you draw nonferrous materials—such as copper and copper coated rods and tubes—it will profit you to put one or more of these outstanding Durpon compounds to work for you *now*. You'll obtain better drawing results, and *reduce drawing costs considerably*.

We have immediately available:

DURPON
for intermediate gauge wire

DURPON L
for heavy wire, rods, and tubes

DURPON FW
for fine wire

Fill out and mail the coupon today. A technical bulletin and trial-size order will be sent promptly.

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NOPCO CHEMICAL COMPANY
Harrison, N. J.

BRANCHES: Boston • Chicago
Cedartown, Ga. • Richmond, Calif.

NOPCO CHEMICAL COMPANY, Harrison, New Jersey

Gentlemen: Please send me a copy of your Bulletin giving information about Nopco DURPON Drawing Compounds.

Name.....Title.....
Company.....
Address.....
City.....Zone.....State.....

Imperfections in Nearly Perfect Crystals

A new book published by **John Wiley & Sons, Inc.**, 440 Fourth Avenue, New York, N. Y., contains over 500 pages of materials and sells for $7.50.

★ ★ ★

The subject matter is concerned with the study of crystal imperfections and grain boundaries in metals, based on scientific theories and experimental facts, and is a summary of 17 papers by 20 contributors prepared for the Committee on Solids, Division of Physical Sciences of The National Research Council, who sponsored a symposium in 1950 to give impetus to research in this field.

★ ★ ★

The important parts of the papers and discussions have been gathered together by an editorial committee headed by **W. Shockley** of Bell Telephone Laboratories. Other committee members were **J. H. Hollomon** of the General Electric Company and **R. Maurer** and **F. Seitz**, both of the University of Illinois.

★ ★ ★

The objective in this work is to advance the knowledge of the crystallography of metals in order to achieve greater strength in metals. This has involved consideration of what takes place when a metal deforms or fractures under stress, which, it is believed, is related to dislocations that take place within the crystals. The first part of the book is concerned with basic concepts, part 2 with the deformation of metals, part 3 with the motions of excess electrons and part 4 with the properties and effects of external and internal surfaces of crystals.

Practical Nickel Plating

A new 48 page booklet has been published by **International Nickel Company**, 67 Wall St., New York 5, N. Y. on nickel plating.

★ ★ ★

In this treatise the applications of nickel plating are discussed, various types of solutions and the properties of deposits are described, the preparation of surfaces for plating set forth, and various operational difficulties and their correction covered.

★ ★ ★

Much other information is given, making "Practical Nickel Plating" virtually a handbook on good nickel plating practice.

Metallurgy for Engineers

This book, compiled over a period of years by **John Wulff, Howard F. Taylor** and **Amos J. Shaler**, of the Metals Processing Laboratory of The Massachusetts Institute of Technology, covers the coating, welding and working of metals. It provides two types of information necessary to the selection and use of metals: the metallurgical principles behind metal processing and the processing of metals themselves. In the author's own words, it is written to help the reader acquire "an adequate understanding of metals so that he may select and use them intelligently."

★ ★ ★

"Metallurgy for Engineers" is divided into 29 chapters, an appendix and an index. At the end of each chapter the reader will find a summary of the most important points, a list of definitions of words and terms, a group of questions by

SEE PAGE 870 for NEWS of the JLE SHAFTLESS TAKEUP

JAMES L. ENTWISTLE CO.

1475 ELMWOOD AVE. PROVIDENCE 7, RHODE ISLAND, U. S. A.

European & South American Agents: M. CASTELLVI, INC. 130 BROADWAY, NEW YORK NEW YORK

British Associate: GENERAL ENGINEERING CO., LTD. BURY ROAD, RADCLIFFE, LANCASTER, ENGLAND

which his understanding may be tested and a list of references of available books containing more information than given in the chapter.

★ ★ ★

Various kinds of metals are covered, together with discussions of wire drawing, spot and butt welding, heat treating, and so on. The book is published by **John Wiley & Sons, Inc.,** 440 Fourth Ave., New York 16, N. Y., contains 624 pages of text matter and sells for $6.75 per copy.

Reel Company Buys Plant in Keene

The Winchester Reel Company, Inc., Ashuelot, New Hampshire, has purchased a three story plant in Keene, New Hampshire, formerly occupied by the De Merritt-Fisher Co., manufacturers of chairs.

★ ★ ★

Reel production will be started in Keene after August first in the new quarters, which add approximately 40,000 square feet of floor space to Winchester's facilities. Reel production will also be continued in Ashuelot.

★ ★ ★

The new owners, who for 20 years have been making reels for the wire industry, have been selling them throughout the country from the Mississippi River east. Their reels are built of plywood manufactured by themselves and are the original famous dowel-constructed types, with tapered, dovetailed joints.

★ ★ ★

Officers and executives of the company are: **Charles H. Ryll,** President and Sales Manager; **Walter Ryll,** Treasurer and General Manager; **Edward Ryll,** Vice President; **Walter Ryll, Jr.,** Engineer, Design and Development; **Edwin Ryll,** Maintenance; **Edmund Ryll,** Sawmill and Lumber; and **Alfred Ryll,** stockholder (with Western Electric Co.).

★ ★ ★

As the Ashuelot plant working to capacity, has been sold out for some time, the new facilities are expected shortly to enable them to provide customers with better delivery service.

Tuthill Offers Guide To Pump Applications

A new type of reference chart on small pump applications has just been developed by **Tuthill Pump Company,** Chicago.

★ ★ ★

In one convenient table, this guide lists the various types of Tuthill pumps, the services for which each is built, the performance characteristics, types of packing, styles of mounting, and features that distinguish each model. Thus, selection of the proper pump for the purpose is simplified, it is stated.

★ ★ ★

Copies of this helpful reference table are available on request to Tuthill Pump Company, 939 East 95th Street, Chicago 19, Illinois.

Vital Parts of Nickel

In Lockheed's radar-guided F-94 jet night fighter there is approximately $50,000 worth of electronic devices whose operations start with streams of electrons given off or caught by tiny nickel rods, tubing, strip or wires inside the vacuum tubes.

precision
wire straightening
and cutting
for all industry...
AIRCRAFT
AUTOMOTIVE
RADIO
TELEVISION
TOYS
COMMUNICATION
TEXTILE
Whenever your wire straightening or cutting problem calls for close tolerances and uniform quality, it will pay you to take advantage of Pittsburgh Cut Wire's long experience to all industry. Expert workmanship and exact machining to your specifications for more than a decade, combine to give you the experience that will serve you best. Call on us for your wire straightening and cutting needs.
Straightening & Cutting in diameter ranges from 1/16" to .005" in all types of wire.
Pittsburgh
cut wire company
1120 Galveston Ave. Pittsburgh 12, Pa

Rome Cable Sponsors Scholarships

Scholarships for study in the fields of science, engineering, or business administration at Cornell University will be established this year by the Rome Cable Foundation, Inc., it has been announced by **A. D. Ross Fraser**, president of the Foundation.

★ ★ ★

The Foundation has appropriated $2,500 for the scholarships this year, and up to $5,000 for next year. The scholarships will be known as the **"Herbert Thomas Dyett Scholarships,"** in honor of H. T. Dyett, founder and chairman of the board of the **Rome Cable Corporation.** Mr. Dyett is an alumnus of Cornell University in the class of 1897.

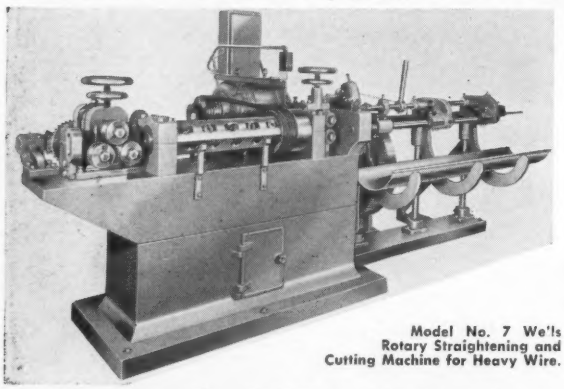
★ ★ ★

Applications for the scholarships will be accepted from boys graduating from the high schools in Rome, N. Y., and from sons of employees of the Rome plant graduating from any school. Eligible graduates wishing to apply should consult the principals of their schools, or they may obtain the necessary information by writing to John H. Dyett, secretary of the Rome Cable Foundation, Rome, N. Y.

★ ★ ★

FAST — DEPENDABLE
WELLS' STRAIGHTENER and CUTTER
For HEAVY Wire

The Model No. 7 illustrated is WELLS' ROTARY STRAIGHTENING AND CUTTING MACHINE for heavy gauge wire. It is designed to handle 1/4", 5/16", 3/8", 7/16" and 1/2" wire at speeds of 90' to 100' per minute on long continuous production runs.



Model No. 7 Wells Rotary Straightening and Cutting Machine for Heavy Wire.

The flier runs in ball bearings, and all wearing parts are made of tough steel castings to give a maximum of service, durability, and strength.

Other WELLS' MACHINES are made to handle smaller gauges of wire at speeds correspondingly higher.

Backed by 57 years of experience in making good straighteners and cutters, every WELLS' Machine may be depended upon to give long, steady and satisfactory service and will do tough jobs that many others will fall down on. The reason—good design, finest workmanship, best materials and experience.

Send today for Catalog No. 50 describing the full WELLS line.

Frank L. Wells Company

5821 FIFTH AVENUE

KENOSHA **WISCONSIN**

Builders of Fine Wire Making Machinery

The Rome Cable Foundation was incorporated in March, 1952, for the purpose of planning and carrying out a coordinated program of benefactions for philanthropic, educational or research causes. Besides Mr. Fraser, other officers of the Foundation are: **Herbert T. Dyett,** vice president; **Harry W. Barnard,** treasurer; and **John H. Dyett,** secretary.

★ ★ ★

Bristol Adds Round-Chart Recorder to Line

The Bristol Company, Waterbury 20, Conn., announces the addition of round-chart recorders and automatic controllers to its line of electronic Dynamaster potentiometers and bridge instruments. The new round-chart Dynamaster models are accurate, high-speed, continuous-balance, null-type electronic instruments which can be used to measure any variable that can be translated into an electrical quantity such as d-c current, d-c voltage, capacitance, or resistance. Typical sensing elements that can be used with the new Dynamaster instruments include thermocouples, radiation detecting units, resistance thermometer bulbs, pH amplifiers, tachometer magnetos, strain gauges, smoke density detectors, thermal converters for power measurements, beta ray gauges, and many others.

★ ★ ★

The measured variable is simultaneously recorded on a 12-inch diameter chart and indicated on a large circular scale which is legible at a distance. Models are offered for full-scale pen travel in 7 seconds, 3 seconds, 1½ seconds, or 2/3 second, and with a wide variety of ranges.

★ ★ ★

The new round-chart instruments feature the same design, construction and electronic components as the company's strip-chart Dynamaster instruments. The unit universal construction permits complete interchangeability of components. The recording mechanism is on the front of a hinged aluminum alloy panel, which can be swung out to gain easy access to the electronic components. The instruments are housed in a moisture, fume, and dust-proof case suitable for wall, flush-panel, or front-of-panel mounting. Round-Chart Electronic Dynamaster instruments are described in Bristol Company Bulletin P1245.

New Bulletin on Hydraulic Lift Trucks

Bulletin 525, just released by **Barrett-Cravens Co.**, presents hydraulic lift trucks which fit into the current trend to move materials and goods in larger loads. These trucks have been designed for the easier and safer one-man handling of heavy skid and box loads.

★ ★ ★

Operation is simple. The operator merely guides the platform of the truck under the skid and lifts the load to travel height with as few or as many strikes of the handle as desired. The handle can be disengaged quickly from its normal upright position to ready the truck for towing. A 6-inch lift is standard for these trucks.

★ ★ ★

Features include: complete hydraulic lifting and lowering; easy travel, due to anti-friction bearings and Zerk lubrication; wide spread front wheels for stability; fully enclosed pump and ram; spring handle hold-up to keep handle in safe position; and easily removable hydraulic unit.

★ ★ ★

Three standard models are shown: ED with 2500 lbs. capacity; LD with 4000 lbs. capacity; and MD with 6000 lbs. capacity. The bulletin contains complete specifications, and also Ordering Information which explains all figures in the specifications.

★ ★ ★

This Bulletin will be mailed upon request by Barrett-Cravens Co., 4609 S. Western Blvd., Chicago 9, Ill.

Bulletin on Aluminum Tubing for Hydraulic Systems

Hydraulic and other fluid-handling applications where the economy and efficiency of aluminum tubed systems can be used to advantage are described and illustrated in bulletin 4316B2 of **The Parker Appliance Company**, which also pictures the twelve Parker aluminum Triple-lok tube fitting shapes now available from standard stock.

New Sprague 20,000-Volt Ceramic Capacitors

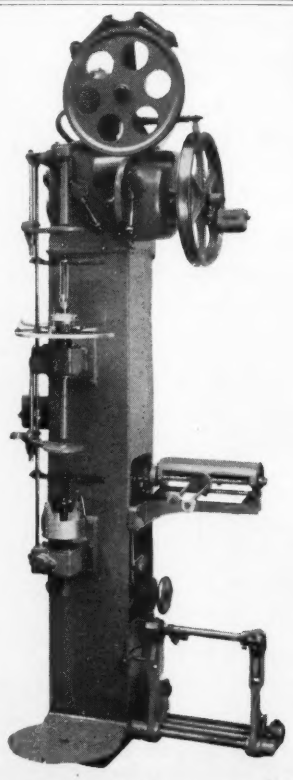
Molded in moisture-resistant, nonflammable thermosetting plastic, rated at 20,000 volts d.c., and designed for 85°C. operation, Type 700C high-voltage ceramic capacitors recently introduced by the **Sprague Electric Company**, 207 Marshall Street, North Adams, Mass., find broad use as high-voltage supply filters in television receivers and cathode-ray instruments. Standard rated capacitance is 500 mmf. Terminal combinations are available to meet any mounting requirement.

★ ★ ★

Developed in the Sprague laboratories, Type 700C capacitors incorporate an exclusive Sprague-made ceramic dielectric element and are encased by a unique molding technique that assures maximum sturdiness and protection.

★ ★ ★

Sprague Bulletin No. 606 giving complete details is available on letterhead request to the manufacturer.



INSULATING MACHINE IM 402

THE BEST MACHINERY FOR WIRES AND CABLES

HERE ARE OUR PRODUCTS:

- **Vertical and Horizontal Insulating Winding Machines**
  Covering wires from 38 AWG size to a 4″ diam. cable, with cotton, silk, nylon, fiberglas, paper or asbestos—for magnet wire, telephone cable, power cable, flexible cable.
- **Bunching Machines for Fine Wire**
- **Assembling Machine for up to 18 Covered Wires**
- **Hi-Speed Winding Machines**
- **Quadding and Twisting Machines**
- **Horizontal Twinners**
- **Rubber Covering Machines**
- **Cable Handling Equipment**
- **Re-Spoolers**
- **Haul-Off Capstans with Variable Drive**

POURTIER MACHINES

153, RUE GALLIENI, ROMAINVILLE (SEINE), FRANCE

17 Ways of Increasing Heat Treating Efficiency with Submerged Electrode Salt Baths

Seventeen ways in which the submerged electrode salt bath furnace can increase metal heat treating efficiency on 10 specific heat treating applications in the temperature range from 1100°F to 2400°F are described in a new bulletin available from the **Ajax Electric Company Inc.**, 930 Frankford Avenue, Philadelphia 23, Penna.

★ ★ ★

Recently introduced by Ajax, the submerged electrode furnaces are a logical addition to the line of suspended electrode furnaces pioneered by the firm, and widely used throughout the industry for a variety of heat treating applications.

★ ★ ★

Copies of the new Ajax Submerged Electrode Salt Bath Furnace Bulletin 123-B are available on request to the manufacturer.

★ ★ ★

Battelle Develops New Extensometer

An improved extensometer with new time-saving and protective features has been developed by engineers at **Battelle Institute**, Columbus, Ohio.

★ ★ ★

The Battelle extensometer automatically releases itself from the test specimen before the breaking point is reached and without stopping the test. The breakaway feature is particularly useful in high-temperature testing operations. In such operations the protection and insulation of the extensometer ha been problems. Automatic release protects not only the extensometer but also the supplementary indicating and recording mechanisms used in the test.

★ ★ ★

The instrument is simple in construction and parts are easily replaceable. License for its manufacture is yet to be issued.

★ ★ ★

New Booklet on Silicone Rubber

Designers, purchasing agents, and engineers will be interested in a new booklet on G-E silicone rubber just published by **General Electric's Chemical Division**. Entitled "Imagineering With G-E Silicone Rubber", the twenty-four page bulletin (CDS-3) includes comprehensive information on properties, applications, classes, and design specifications of G-E silicone rubber.

★ ★ ★

The applications illustrated in the booklet clearly show how the unique properties of G-E silicone rubber are helping to make better products, improve production processes and develop entirely new products. These properties include resistance to temperature extremes, release from sticking, inertness, and unusual surface properties.

★ ★ ★

One Year's Payroll Equals 25 Years' Dividends

All the dividends paid by the steel industry to its stockholders during the past twenty-five years would only equal the 1951 estimated payroll of the entire industry.

WAFIOS

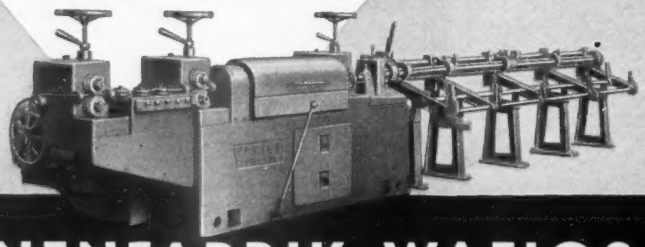
WIRE-WORKING MACHINERY

Wire Netting Machines for Chain Link, Hexagonal Mesh, Poultry Netting, Field Fence. Crimping, Barb Wire and Staple Machines. Spring Coilers. Spring End Grinding Automatics. Loop Benders. Upholstery Spring and Wire Mattress Machines. Wire Nail Machinery. Chain Formers. Chain Welders. Straightening and Cutting Machines. Multi-Slide Wire and Strip Forming Machines. Special Machinery for the making of Paper Clips, Lock Washers, Bale Ties, Key Rings, Tin Openers, Wire Bag Ties, etc. Automatics for Flexible Metallic Tubing.

Sole Agents for Australia and New Zealand: Bliss & Reels Co. Pty. Ltd., 64-66 Little Bourke Street, Melbourne C. 1, Australia.

WAFIOS

SINCE 1893



MASCHINENFABRIK WAFIOS

WAGNER, FICKER & SCHMID REUTLINGEN 3 / WURTT. GERMANY

MIL-R-93A and JAN-R-93 Specs Compared

A quick guide to acquaint users of precision wire-wound resistors with the significant differences between the new MIL-R-93A specifications and the old JAN-R-93 specifications which they supersede has been prepared by the **Shallcross Manufacturing Company,** Collingdale, Pa. Included is a cross-reference table contrasting MIL, JAN, and Shallcross style numbers; bobbin sizes; maximum resistance available; and both MIL, JAN, and commercial power ratings. Another chart will prove of material assistance in the selection of various resistance alloys for applications under MIL-R-93A temperature coefficient "E", "J", and "K".

★ ★ ★

Copies of the new Shallcross bulletin L-27 are available on letterhead request to the manufacturer.

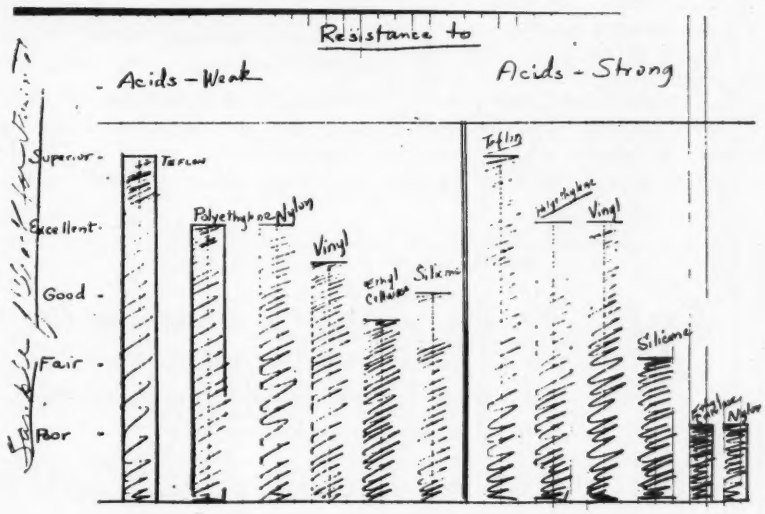
★ ★ ★

Cable Installations in Chemical Plants

(*Continued from page* 888)

professional approach. New developments are continually arising to make for different answers with time or geography.

Fig. 5



Use **"ALBRO" METAL** *for Long Life and Economy in Pickling*

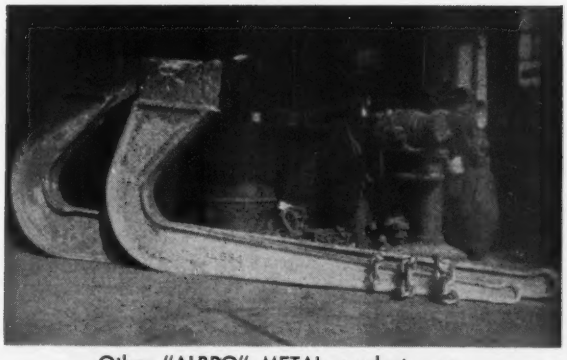
for: HAIRPIN HOOKS • PICKLING CHAINS • BASKETS, ETC.

They last! You can cut your hook costs in half. "ALBRO" METAL IS extremely resistant to acid corrosion — and very strong.

One customer used our hooks for 5 years and ordered 20 more — the corrosion over that period had been negligible.

We extend to you an opportunity to avail yourselves of our engineering co-operation. We build to your specifications.

Send us your drawings. Or wire, write or telephone, asking to have a representative call on you.



Other "ALBRO" METAL products are:
CRATES, AND HANGERS, BOLTS & NUTS

ALBRO METAL

BRONZE DIE CASTING CO.
FRANKLIN ST. AT OHIO RIVER
PITTSBURGH 33, PA.
TEL.: CEDAR 1-5987-8

Eisler Motorized Turntable

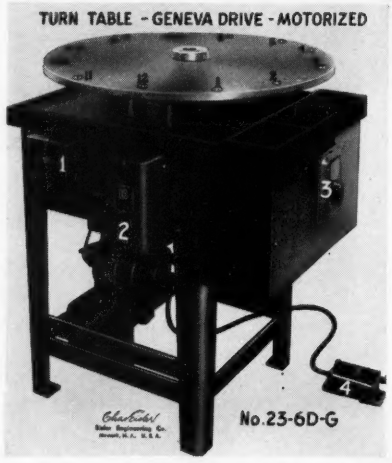
A motorized turntable for use in production work has been placed on the market by the **Eisler Engineering Co., Inc.**, 750 South 13th St., Newark 3, New Jersey. This turntable can be supplied with from 6 to 48 positions. This type of equipment can be used for many purposes in various production lines where the requirements are for turning the work spindle, rotating the spindle, and starting and stopping at various positions where various operations can be placed on the particular spindle in accordance with the requirements. A few examples of use in production are mentioned in the following:

For the Glass Industry: Lamps, electronic tubes, electronic parts, glass bottles, bead making on leadwires, vials, etc., in use for glazing, sealing, cracking-off, mounting, spraying, etc.

For the Metal Industry: In use for soft and silver soldering, brazing, assembling, spraying, marking, welding, induction heating, etc.

★ ★ ★

The index speed can be adjusted with the combination of the timer and adjustable speed pulley from a few seconds to several minute intervals. An additional foot switch can control the index time for any desired length of operating period. The work spindles are either rotating or stationary.



Eisler Motorized Turntable * * * *

Melvin E. Haas

Melvin E. Haas, 45, Chicago district sales manager for the **G. F. Wright Steel & Wire Co.**, Worcester, Mass., died on June 13th.

Universal-Cyclops Appointments

R. C. Rudolf was recently elected assistant secretary, Universal-Cyclops Steel Corp., Bridgeville, Pa., and **E. J. Reagan** appointed manager of stainless bar and wire sales.

Bulletins on Forming Machines

Two new bulletins are available containing details of the **Baird Machine Co.'s** automatic four-slide wire formers and automatic bench power presses. The wire former may be used with both wire and ribbon stock while the power presses are reported to form strip stock in many different shapes. Copies will be mailed upon request to the company at 1700 Stratford Ave., Stratford, Conn.

Thread Die Company Promotions

Reed Rolled Thread Die Co., Holden, Mass., appointed **Joseph S. Seville**, formerly chief engineer, as

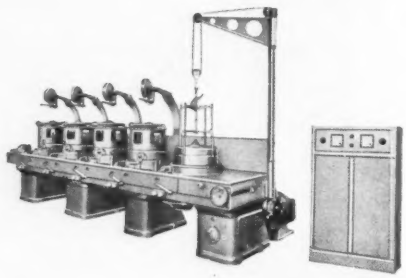
EW

Wire Drawing Machines, working on the dry or wet method (soap powder or by immersion) for iron, steel, copper, aluminum and other metal wires.

Metal Wire Cloth Weaving Looms (fly & mosquito nets, sieves, plastering work, etc.)

Automatic Straightening and Cutting Machines

Machines for producing: Wire nails and wire tacks, rivets, iron & wood screws, small nuts, welded and non-welded chains, knotted chains, barbed wire, wire pins, safety pins, hair clips, spokes and nipples for bicycles, etc.



EMILIO WARTENWEILER,

MILAN (Italy), Via Pergolesi, 18.

Tel. 21 245

superintendent and **George W. Lyman**, formerly superintendent, as chief engineer. **M. Lawrence Price**, professor of machine design at Worcester Polytechnic Institute, was granted a leave of absence to devote full time to research for Reed Rolled Thread Die Co. His activities will cover problems involved in formation of screw threads and special forms by cold rolling.

New Methods Double Nut Production

New production methods developed by Jacobson Mfg. Co. Inc., Kenilworth, N. J., are enabling it to turn out cold punched nuts at substantial savings. The company says conventional production rates prevalent in its type of industry was more than doubled, partly by using carbides and employing a concentrated cutting oil jet on threading operations. Nuts produced are of steel, brass and stainless steel.

Batch Production Case Hardening

Standard batch furnaces for case hardening steel are the subject of a new bulletin just released by **Surface Combustion Corporation.**

★ ★ ★

Controlled atmosphere equipment, including muffle furnaces and generators plus salt bath pot furnaces and direct-fired oven furnaces, are shown and described with typical applications to gas carburizing, liquid carburizing and cyaniding and pack carburizing.

★ ★ ★

Write direct to Advertising Department, Surface Combustion Corporation, Toledo 1, Ohio.

Glossary of Iron Casting Terms

This 36 page booklet explains over 150 technical terms that are used in common between suppliers and users of ferrous and non-ferrous castings. It is offered to increase a mutual understanding that promotes greater accord in working out the procurement of satisfactory and improved castings. The booklet should prove useful to the designer, machinist and purchaser of castings as well as to the man in a foundry. Write to **International Nickel**, Dept. EZ, New York 5, N. Y., for a copy.

STRONG, DEPENDABLE

PLYWOOD REELS

ALL WINCHESTER REELS are made of plywood, fastened securely with dowel pins. Parts are so glued that joints will not open. Tapered dowels make our reels extremely rigid. These reels, so popular in the wire industry, are our original famous dowel constructed types that stand severest handling.

Made in sizes 6" to 24" in flange diameter
in returnable and non-returnable types.

Shipments made to any place in New England by truck. Beyond New England, reels are shipped to you by freight.

Write today for quotations.

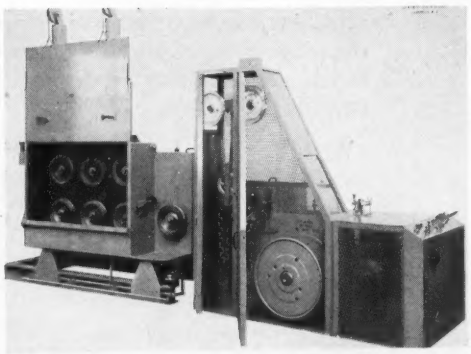
WINCHESTER REEL COMPANY, INC.

ASHUELOT, N. H. **Tel.: WINCHESTER 163-2**

ESTABLISHED IN 1933

Our Products Carry Reel Loads

INTERMEDIATE WIRE DRAWING MACHINE FOR NON-FERROUS WIRE



Finish Speed 4000
and 5000 F.P.M.
13 Die—Enter B & S No. 8
Finish B & S No. 18 to
B & S No. 26

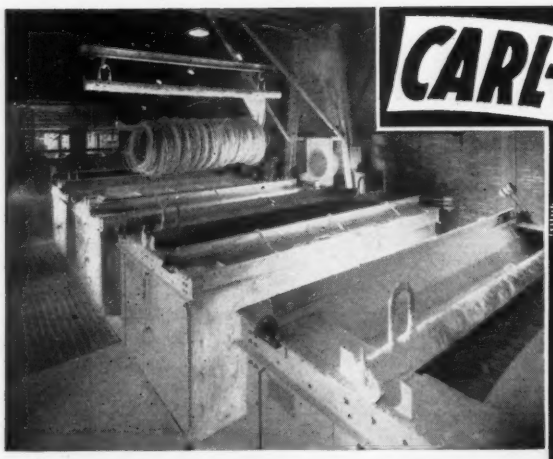
Picture at left shows Cook Intermediate Wire Drawing machine with Take-up Equipment.

OTHER COOK EQUIPMENT

- Wire Drawing machines
- Bunchers
- Twisters
- Wire String-Up machines
- Enameling Take-Ups and Pay-Offs
- Enameling machines
- Cabling machines
- Spoolers
- Tinning Take-Ups and Pay-Offs
- Tinning Pots
- Wrapping machines
- Special machinery

COOK MANUFACTURING COMPANY

265 NORTH 9TH STREET **PATERSON 2, N. J.**



CARL-MAYER

HI-SPEED REGISTERED

ROD BAKERS

PATENT Nos. U.S.A. 2,235,559 2,296,361 2,323,828 CANADA 396,144 401,589

ALSO OTHER TYPES OF INDUSTRIAL OVENS AND FURNACES

GREATER SPEED AND FUEL ECONOMY PROVES OUTSTANDING ENGINEERING

Carl-Mayer Hi-Speed Rod Bakers have an exclusive heating arrangement, combining faster baking with amazing fuel economy — and a patented Blow-Off feature which removes moisture without bumping or agitating the coils. *WRITE FOR BULLETIN NO. 350.*

SERVING CONCERNS LIKE THESE:

American Steel & Wire Co.
Atlantic Wire Co.
Atlas Steel Co.
Atlas Tack Corp.
Babcock & Wilcox
Canadian Steel Corporation.
California Wire Cloth Corp.
Colorado Fuel & Iron Corp.
Crucible Steel Co. of America.
Eaton Manufacturing Co.
Frost Steel & Wire Co., Ltd.
B. Greening Wire Co., Ltd.
Gary Screw & Bolt Division of Pittsburgh Screw & Bolt Corp.
Hollup Corp.
Indiana Steel & Wire Co.
Johnson & Nephew, Ltd.
Jones & Laughlin Steel Corp.
Page Steel & Wire Co.
Pittsburgh Tool Steel Wire Co.
Republic Steel Corp.
Steel Co. of Canada

THE CARL-MAYER CORPORATION

3030 EUCLID AVENUE
CLEVELAND, OHIO

NORBIDE® Abrasive: *Effective, Economical*

NORBIDE Abrasive, made of Norton Boron Carbide, is second only to the diamond in hardness — *but 150 times less expensive!* It will effectively cut and semi-finish wire drawing dies, particularly those made of the hard cemented carbides.

Write for Catalog No. 559-W

NORTON COMPANY
Worcester 6, Mass.

NORTON *Making better products to make other products better*

Two New Extruders Introduced

A new NRM 2½" rubber extruder, designated the NRM heavy duty Model 50, has recently been put into production by the **National Rubber Machinery Company,** Akron 8, Ohio. Incorporating the very latest improvements in rubber extruder design, the NRM 2½" Model 50 rubber extruder is a versatile production extruder designed for producing all standard rubber extrusions, including wire, cable, and hose covering.

★ ★ ★

Having a nominal capacity of 200 to 250 lbs. per hour, it features a new self-contained, heavy duty cone worm gear reduction unit, and a new space saving fabricated steel base.

★ ★ ★

At the same time a new Model 50 2½" oil heated plastics extruder was announced. This features a new, totally enclosed 15 H.P. drive transmission, with a heavy duty cone worm gear reduction unit. Special consideration has been given so that cylinder assembly, screws, dies and die adaptor gate are interchangeable with other NRM 2½" oil heated extruders.

★ ★ ★

Catalogs RM-2.5 and P-251-O covering the two machines respectively may be secured from the company.

Portable Cutting Tools Catalog

The Manco Mfg. Co. of Bradley, Illinois has released a new catalog on their line of portable cutting tools. Ranging from economical, light-weight hand cutters to larger, high-capacity bolt cutters, a complete line of hand-operated units for cutting steel rod, wire, fence, steel strapping, high tension wire, and a wide variety of other materials is offered in this catalog. Photographs and complete specifications accompany each model described in this attractive 2-color, four-page catalog.

New Equipment Item Fireye Photoelectric Flame Failure Safeguard

For Flame Failure Protection of commercial and industrial oil burn-

ing equipment, Combustion Control Corporation introduces Fireye Flame Failure Safeguard Type F18T-3. Fireye provides operating flame failure protection for manually ignited oil burners, air heaters, ovens, kilns, etc.—and is used with programming controls to protect automatically ignited oil burner installations. On existing installations, this highly efficient safeguard is readily substituted for slow-acting thermally responsive switches to give increased flame failure protection. Fireye Type F18T-3 is approved by all leading insurance laboratories including Underwriters' Laboratories Inc., and Factory Mutual Laboratories.

★ ★ ★

Fireye Photoelectric Flame Failure Safeguard Type F18T-3 consists of a phototube and amplifying system housed in a compact, rugged, dust-tight aluminum case. The last word in electronic circuit design has been combined with numerous mechanical refinements to make this control the most reliable and foolproof available to industry. Special heat-resisting filters and insulating fins serve to insulate thermally the housing from the high furance temperatures so that the entire control may be mounted directly on the furnace wall. All electronic components are of the highest quality and have been proven by years of dependable service in Fireye equipment.

★ ★ ★

Other features include a hermetically sealed time delay element which prevents the flame relay from dropping out from purely transient disturbances, a pilot light to indicate flame failure which can be viewed through an angle of 180°, and a cover switch to prevent unsafe operations of the control should the cover be removed.

★ ★ ★

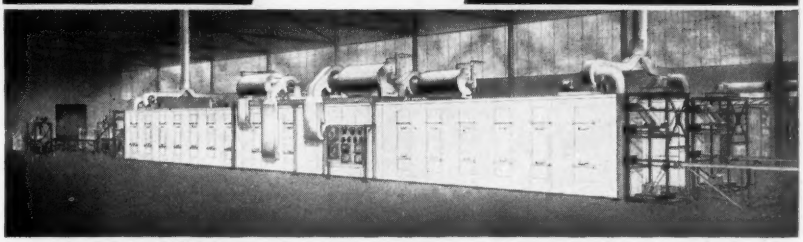
This Type F18T-3 is described in Bulletin CA522, issued by **Combustion Control Corp.**, 77 Broadway, Cambridge 42, Mass.

Nickel From Canada

Canadian producers of nickel in 1951 were responsible for approximately 275,000,000 pounds of nickel production, or more than 90 per cent of the free world's total.

CARL-MAYER WELDING ROD OVENS

PATENT NOS. 1,843,430 2,373,325



One of Several Carl-Mayer Ovens at Hollup Corp.

FAST, EFFICIENT AND ECONOMICAL DRYING OF COATED WELDING RODS.

Only in Carl-Mayer Ovens can you obtain the combination of the recirculating gas fired air heater principle and the "Mayer" patented rod transfer system — two highly important features in ovens of this type.

We also build other types of industrial ovens and furnaces. Carl-Mayer installations are backed by reputation for unusual performance, and over 30 years' experience.

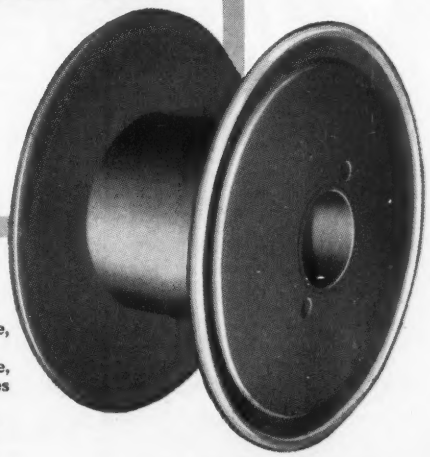
WRITE FOR BULLETIN NO. 350

THE CARL-MAYER CORPORATION

3030 EUCLID AVENUE
CLEVELAND, OHIO

What's your problem with...

SPOOLS
REELS
BOBBINS?



Get in touch with Apco Mossberg. We are familiar with the production problems involving steel spools, reels and bobbins, utilized in the copper wire, steel wire and wire rope industries. Profit from our half-century of experience, engineering know-how and plant facilities —making possible the manufacture of almost any conceivable kind, type, size and quantity of steel spools, reels and bobbins. Contact us for free engineering service. Without obligation we will be glad to offer suggestions and solutions to your particular problems.

Write TODAY for a copy of our booklet that illustrates:

- *Flat Head Spools*
- *Curled Flange Spools*
- *Stranding Reels*
- *Take off Reels*
- *High Speed Wire Drawing Reels*
- *Vulcanizing and Insulating Reels*
- *Pressed Steel Bobbins for Wire Weaving*

APCO MOSSBERG CO.
(The original Frank Mossberg Co.)
Attleboro, Mass., U.S.A.

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Gordon Proffitt
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215 Market Street
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47 Colborne Street, West
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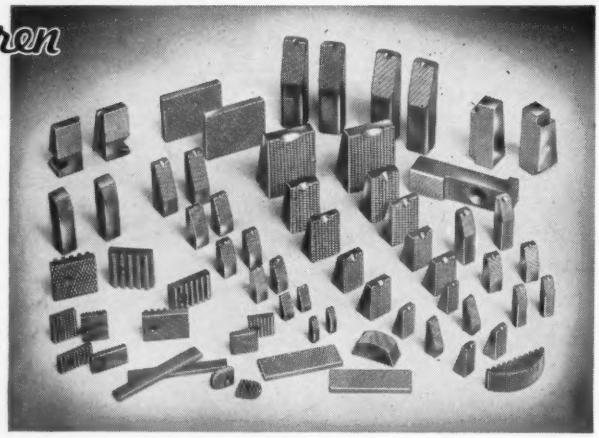
Sjogren

JAWS.... for Wedge Grips, Pullers and Tensile Testing Machines of all makes are available either from stock or manufactured to order. A Sjogren jaw, made to meet your requirements, guarantees you service.



Our Silver 25 1927-1952 Anniversary Year

SJOGREN TOOL AND MACHINE CO., INC.

WIRE PULLERS • WEDGE GRIPS • JAWS FOR ALL MAKES OF PULLERS AND TESTING MACHINES • CAGE ROLLERS • SWAGING HAMMERS • POINTING DIES • WIRE SPOOLERS

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Represented in Canada by THE LARSON CO., 98 Wellington St., West, Toronto, Ont.

WIRE DRAWING

FROM .0403" TO .005" (Not Annealed)

FERROUS and NON-FERROUS WIRES

SPECIALISTS IN:

- WIRE STRANDING
- BUNCHING
- SPOOLING
- BRAIDING

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BUY WITH CONFIDENCE — ANCHOR QUALITY

ANCHOR WIRE CORPORATION
183-16 JAMAICA AVE.
JAMAICA 3, LONG ISLAND, NEW YORK

Plastic Insulating Techniques Shown to Austrian Wire Experts

A productivity team of nine Austrian experts representing their country's wire and cable industry, visited **B. F. Goodrich Chemical Co.** here June 20 to study insulating and testing techniques using Geon polyvinyl plastic materials. A group tour through the Company's Avon Lake, Ohio, Sales Development Laboratory, was conducted by **O. E. Isenburg,** manager — international sales.

★ ★ ★

After seeing a Geon polyvinyl chloride plastic compound made from its basic ingredients, the group saw the compound milled on a two-roll plastic mill. Plasticizer, stabilizer, filler, and color were added during milling and the compound was then granulated into 1/8" cubes. The actual process of extruding Geon onto wire as an insulation material was also demonstrated and test samples were given a complete range of electrical and physical tests.

★ ★ ★

August Fuchs, Technical Manager, Eldra, Graz—Puntigam, Graz, Austria, is leader of the team which is sponsored by the Mutual Security Agency. Accompanying the group is **Kurt F. Ulrich,** president, Amtria Merchants Corp., exporters, importers, and representatives for all B. F. Goodrich Chemical Co. products in Austria.

Cutting 1/2-Inch Steel Rod in a Hurry

The new bulletin illustrating and describing the latest Manco Model 200-E Guillotine Hydraulic Cutter gives complete specifications and information on this unit. This new cutter provides 20 tons thrust to cut 1/2-inch carbon steel rod in 1/4 second with push-button control.

★ ★ ★

Published by the **Manco Manufacturing Company,** Bradley, Illinois.

To Represent Fullerton in Indiana

Paul L. Funk was recently named Indiana district representative for **Fullerton Steel & Wire Co.,** Chicago.

Nickel Aids Electronics

As part of its contribution to nickel conservation, International Nickel initiated production of nickel-clad steel strip and nickel-clad wire as temporary substitutes for solid nickel in the electronic field.

Stainless Wire—For Safety

Strap springs for all U. S. Air Force parachutes are now being made from austenitic chromium-nickel stainless steel wires that develop tensile strengths from 300,000 to 350,000 pounds per square inch. There is no severe loss of toughness in these strap springs even when temperatures fall below zero, and they are five times as strong as structural carbon steel.

Dial Screw Expands

Dial Screw Products Co., Inc., Woodside, N. Y., has completed a new plant at 126-02 Northern Blvd., Corona, N. Y. This is the second expansion move during the past year for the company, designed to meet the growing demand for its products.

Rodine Selection Chart

A new Technical Service Data Sheet, No. 13-1-1-4, has been compiled by research chemists of the American Chemical Paint Company, Ambler, Pa., shows the characteristics of various types of Rodines used in sulphuric, muriatic and mixed acids.

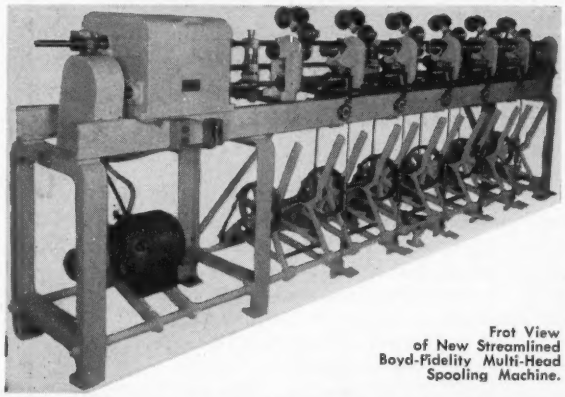
★ ★ ★

Rodine is, of course, a pickling acid inhibitor, but it comes in various powdered and liquid forms and for best results must be used as directed for the different acids or acid combinations. This data sheet will save much time in determining the proper acid-inhibitor applications and relationships. You are invited to send for a copy of the chart.

★ ★ ★

A New and Improved . . . .

MULTI-HEAD SPOOLER



Frot View of New Streamlined Boyd-Fidelity Multi-Head Spooling Machine.

This six-head spooler has a common traverse for all spindles. Each spindle is started independently by manual control and stopped automatically by a predetermined footage counter through a solonoid release clutch. Th e rate of traverse for different wire sizes is governed by easily changed gears. All parts precision made.

Will wind wire on spools up to 10" in diam. and traverse of ½" to 8". Furnished also to wind on wider spools, if desired, and with one to twelve spindles. Counter stop-motion, wire compensators and wire straighteners are optional equipment. Anti-friction bearings. Spindle speeds up to 1200 R.P.M. possible.

Send for full details.

BOYD & SONS MANUFACTURING CORPORATION

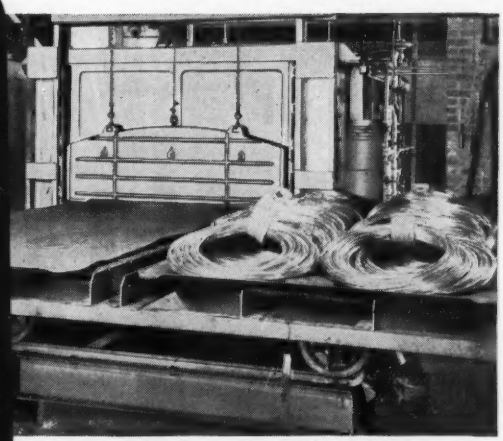
1434-38 Callowhill St., **Philadelphia 30, Pa.**

ROCKWELL FURNACES

for Annealing Hardening · Drawing · Normalizing Galvanizing and Tinning

Batch or Continuous · Oil, Gas or Electric

Direct Heated Muffle Type Radiant Tube Atmospheres



Gas-fired pan type furnace for annealing 5000 lbs. of medium gauge brass wire; furnace atmosphere controlled to produce oxide-free wire — in many cases practically bright. Other Rockwell furnace types include parallel tube, belt conveyor, pit, hood and others.

ROCKWELL SINCE 1888 BUILT

FURNACES · OVENS · SPECIAL MACHINERY

W. S. ROCKWELL COMPANY

242 ELIOT STREET · FAIRFIELD, CONN.

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Avail YOURSELF OF THE "KNOW-HOW" OF MICHIGAN OVEN ENGINEERS

LET US SOLVE YOUR ANNEALING AND ENAMELING PROBLEMS

•

If you have an annealing or enameling problem that baffles you, turn it over to us for solution. No matter how tough it may be, we are confident that our staff of oven designers, with their combined oven engineering experience of 150 years, will come up with the answer. Would you like our representative to call? No obligation.

Write for Brochure: "Your Oven Problems"

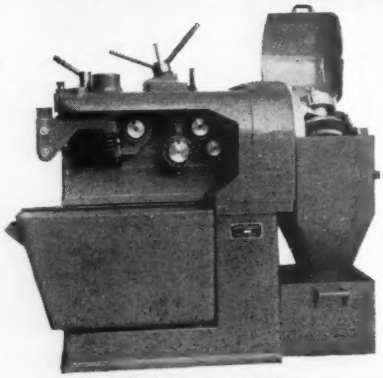
MICHIGAN OVEN COMPANY MOCO

Representatives In Principal Industrial Areas

MICHIGAN OVEN COMPANY
425 Brainard Street, Detroit 1, Mich.

Save with the tried and proven

LINÉ-GORCY MECHANICAL ROD DESCALERS



(World-Wide Gorcy Patents)

Dry Clean your rods the Gorcy way and save *everything* — even that valuable by-product *—Scale!*

— SAVE ACID — SAVE METAL
— SAVE LIME — SAVE STEAM
— SAVE HEAT — SAVE WATER
— SAVE FLOOR SPACE
— SAVE HANDLING, ETC.

Question: Can your mill afford to delay delivery of its first Liné-Gorcy Descaler?

Answer: Send your inquiries now to—

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SOLE AMERICAN DISTRIBUTORS
Suite 1119 — Chanin Building
22 East 42nd Street
New York 17, N. Y.
Telephone: MUrray Hill 5-1937

New Cleveland Tramrail Catalog

A new revised edition of Booklet #2008-H titled "Cleveland Tramrail Engineering and Application Data" has been issued by the **Cleveland Tramrail Division of The Cleveland Crane & Engineering Co.**, Wickliffe, Ohio.

★ ★ ★

This Booklet is designed to give anyone a good conception of what tramrail overhead materials handling equipment consist of and how it can be applied to bring about one or more of fifteen definite advantages, one of which is the drastic lowering of manufacturing costs.

★ ★ ★

Of special interest is the new material on Pages 4, 5 and 6 covering track design, track stresses and the solution to track peening.

★ ★ ★

All of the more important features of overhead tramrail equipment are described, including the flexible method of track support, carrier designs, motor head construction, track switches, cranes, automatic interlocks and types of electrification.

★ ★ ★

A great many photographs and sketches are used throughout. A number of varied applications are illustrated.

★ ★ ★

Available free upon request.

Canada Tops in Nickel Production

Canada climbed to the acknowledged first place in the production of nickel in 1905—three years after the Canadian nickel-copper ores and the then best method for their separation into nickel and copper, the so-called Orford Process, were brought together in the formation of the International Nickel Company. At that time, Canadian nickel production was at a rate of slightly over 1,500,000 pounds per month. Today International Nickel alone is producing 21,000,000 pounds per month and total Canadian production is over 23,000,000 pounds monthly.

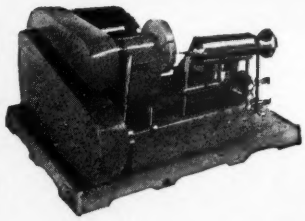
DYKREX

Precision

PIN GRINDER

Saves Labor

Saves Money, Saves Time



Ordinary Unskilled Die Room Workers make them Faster and Better

These precision pin grinders are made so that any die room worker can produce lapping machines faster and better than a skilled lathe worker or machinist. With the special compound type of pin holder, simply set the compound at the degree of angle the pin is to be ground and "feed" the pin to the grinding wheel. The grinding head may be used in a stationary position or released by the hand shift lever, and the grinding head operates horizontally to give the finished pin a better and finer finish.

The machine is mounted on a heavy cast iron base and is furnished complete with 1/3 H.P., 110 Volt, 60 Cycle, single phase motor and standard V type belts.

DYKREX
"IT CORRECTS THE DIE"

Write for Full Information
ROOS TOOL & MFG. DIV.
DYKREX CORPORATION OF AMERICA
33-35 Bloomfield Ave., Newark 4, N.J.

Your Company is "Exhibit A" to Your Employees

(*Continued from page* 892)

their employees, often in the form of special reports which dramatize the contents and make them easier to grasp. Instruction in how to read the Annual Report leads employees safely through the reported facts, explaining the terminology and creating confidence in the all-over financial management of the firm. Further, even if all employees don't fully understand the report, the very fact that management is willing to make the figures available, in and of itself, builds employee confidence and morale.

★ ★ ★

All such steps, including the impact of taxation on the company and its investors, as well as on the industry and on the national economy, inevitably add up to define **top management's job**—including the coordination of men, money, materials and machinery, and the use of controls to keep their respective contributions in balance. The need for decision-making, and the management know-how and specialization which make sound decisions possible can be spelled out in this section.

Illustrating Economic Principles

Through the judicious use of company material it is possible to illustrate and explain a wide range of economic principles which otherwise might be difficult for some employees to grasp. For example, the concept of overhead can be expressed in terms of various departments, including their titles, locations and functions. Specialization as a principle becomes clearer when management structure and purpose are used as examples. Profits are often viewed in a different light when related to job security, expansion, improved working conditions and pensions. The same is true of financial soundness. The money-credit-investment story can be pegged to company financial reports, the accounting organization, the ratios of payroll and employee benefits to other major expenditures, and the cost of improvement in plant, equipment and working conditions.

★ ★ ★

S. A. ETECO

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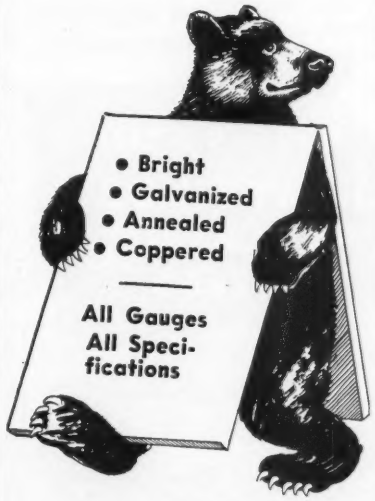
(BELGIUM)

Selling Office for
Tréfileries León Bekaert, S.P.R.L.

STEEL WIRES

IF YOU REQUIRE



NO CMP REQUIRED

Submit your SPECIFICATIONS To The REPRESENTATIVES:

J. GERBER & CO., INC.

855 Avenue of Americas
NEW YORK 1, N. Y.

HAVING TROUBLE WITH LIGHT WEIGHT REELS FAILING IN HEAVY DUTY SERVICE?

MILTON MACHINE offers you

A SOLUTION TO YOUR PROBLEM that'll save on replacement and maintenance!

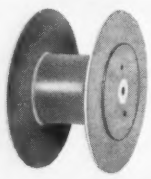
RUGGED STEEL HEAVY DUTY PROCESSING REELS

HEAVY DUTY REEL

Designed for the heavy duty service of a wire rope manufacturer. Flanges with rope brake rim grooves are heavily ribbed semi-steel castings.

WELDED STEEL REEL

Made to wire rope mill's specification to replace light weight pressed steel reels that failed in heavy duty service.



SOLID STEEL PROCESSING SPOOLS & BOBBINS

WRITE FOR BULLETIN 52-W

Your inquiries are invited . . . write or phone, our field engineer-representative will be glad to describe our facilities.

MILTON MACHINE WORKS, Inc.

DESIGNERS – ENGINEERS – MANUFACTURERS

MILTON • PENNA.

Using Company Information Effectively

Content, of course, is only one part of the economic education program. There are other important facets, including such vital factors as advance preparation and communication. Each is a story in itself. Preparation is a critical phase because the record shows that companies which go about the job in hit-or-miss fashion seldom get very far. The firms which obtain the best results are those which organize the people and the tools for such a project, and which proceed only after careful study of their personnel.

★ ★ ★

Our experience proves that every program should be prefaced by research to determine the employees' readiness and ability. to absorb economic information. The management should know about their attitudes, their background as members of a social group, their economic behavior and habits, the language they speak, their areas of interest and the level of their knowledge. Knowing **why** foremen and employees hold the opinions they do is the beginning of wisdom in developing a practical program.

★ ★ ★

So far as communication is concerned, **all** channels possible should be used. Word-of-mouth is what counts most, and the foremen is the logical incumbent for the "economics teacher" role. This means that supervisors must be given the right information and shown how to use it effectively, which is half the battle. Various types of printed and graphic material should also be employed—letters from the president, house publications, employee annual reports, bulletin boards, local newspaper advertising, and so forth. All should be used to supplement, rather than replace, word-of-mouth. At all times, the objective should be two-way communication—stimulating employees to ask questions and initiate discussions, as well as dissemination of information from the top.

★ ★ ★

Hard work, to be sure, but worth it! As Harold Stassen once remarked, "The most important single

BUNCHING (TWISTING) AND STRANDING IN THE WIRE AND GENERAL MANUFACTURING PROCESSES

SPECIALIZED ENGINEERING AND SPECIALIZED FACILITIES AT YOUR SERVICE

Expanding application of twisting principles to the production of many products is reflected by an ever-increasing demand for both H-D standard equipment as well as machines especially engineered to solve varied production problems. Week after week surprising new uses are developed through the close cooperation of our engineering department with manufacturers in many fields.

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informational job that needs to be done in America is to develop a better understanding by the American workmen of the modern capitalistic system of which they are a part. If they get to understand it thoroughly, they will never change it."

★ ★ ★

Copperweld Fine Wire

(*Continued from page* 880)

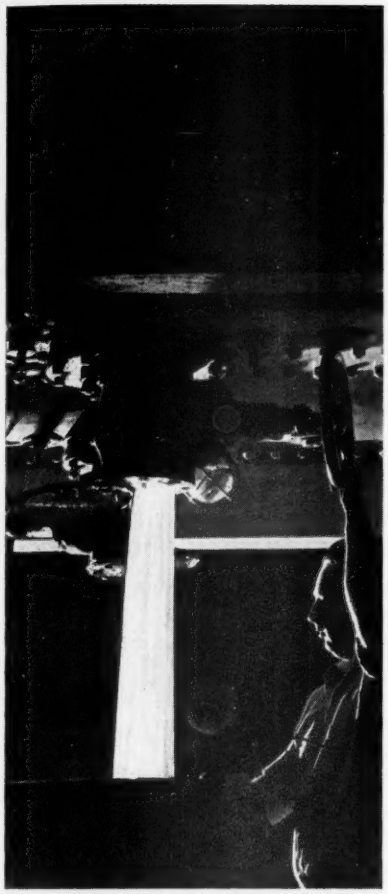
Music String Wire

Several manufacturers of strings for pianos and other musical instruments have adopted Copperweld in place of copper. Here the advantages are high strength, good workability and the important copper saving feature.

Other Uses

There are, undoubtedly, many other applications in which Copperweld wire will provide a stronger and better product—improved performance and longer life. Those listed are typical and will suggest other applications where an investigation of Copperweld's properties may improve the product while at the same time saving important copper.

★ ★ ★



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To be sure of maximum protection, specify *New England* lacquer, formulated to your exact needs by wire specialists!

The above photograph is one of many contained in an eight-page brochure describing our facilities to serve you. Write for your copy of the complete brochure!

NEW ENGLAND LACQUER CO.

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EAST PROVIDENCE, R. I.

SPECIAL NOTICE

regarding the

WIRE AND WIRE PRODUCTS BUYERS' GUIDE AND YEAR BOOK OF THE ASSOCIATION.

We are very sorry that our supply of the 1952 edition of this useful directory has been completely exhausted and that we cannot fill further orders until the 1953 directory is printed.

An unusual demand for the book, in spite of a larger press run, has absorbed all but our file copies. Orders sent now will be filled promptly when the next edition—for 1953—is published.

WIRE AND WIRE PRODUCTS

453 Main St. Stamford, Conn.

Get Extra Production Without Extra Man-hours... Use

BORAX

● If you're using a lime bath or other compounds for steel wire-stock surface protection, change over to BORAX! This safe, clean, easy-to-handle material is practically dust-free. BORAX, readily soluble in water at working temperature... (190°-200°) eliminates the need for bath solution agitation. Just ONE DIP, which dries quickly in a few minutes, gives an adequate, non-flaking, protective film to rods and wire. This tight, pliable, film of BORAX allows your operator to feed at much faster speeds because of its great affinity for soap lubricants... yet you get longer and more accurate performance from your dies! The film remains on the finished wire as a rust-resistant and is a natural flux. Yes, BORAX has *all* the advantages; use it to get *extra* production!

Here Are The Advantages of Borax-Coated Stock:

- **Compatible with drawing lubricant.**
- **Cleaner to handle in transit.**
- **Remains in better condition...** *an adequate supply can be stored for weeks without reconditioning.*
- **No cleaning of ends necessary before electric butt welding.**
- **Rust inhibited... no oxide film forms.**
- **Can be cleaned most easily.**

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MASON CAN COMPANY
1949 Dexter Rd., East Providence 14, R. I.
MASON CAN COMPANY OF OHIO
Greenville, Ohio

The Increasing-Load Wire Abrasion Tester

(*Continued from page* 873)

Twenty-five specimens of each wire were tested. Four tests were made on each specimen in four planes about the circumference of each. The minimum and maximum values in each series of four tests were noted. The average of the 25 minimums is called S_1 and the average of the 25 maximums S_2. A measure of the uniformity of the results is obtained by taking the ratio $\frac{S_2}{S_1}$. Values of $\frac{S_2}{S_1}$ which is termed "Average Spread Ratio" are given in Table I for representative groups of wires.

TABLE I

COMPARISON OF THE UNIFORMITY OF TEST RESULTS

Average Spread Ratio $\frac{S_2}{S_1}$

Wire	Repeated Scrape Abrasion Tester	Increasing Load Abrasion Tester
A	2.10	1.13
B	1.90	1.17
C	2.80	1.32
D	2.00	1.22
E	3.00	1.16

The values given in Table I are typical of those obtained in routine tests on production samples. In general, results from the Repeated Scrape Tester tend to deviate from the mean by about 20%, while those from the Increasing Load Tester deviate by about 5%. In view of such results it seems clear that an important improvement has been made in wire abrasion tester design by the development of the Increasing Load Wire Abrasion Tester. Experience thus far has indicated that the new device is a very satisfactory control tester for abrasion resistance.

★ ★ ★

The Increasing Load Wire Abrasion Tester also has one other advantage. In using the standard Repeated Scrape Abrasion Tester common practice is to shut the tester off if the wire under test lasts longer than a specified number of strokes because often wires tested at specification loads will continue for a much greater number of strokes. With the new device every test goes to an end point in a reasonably short

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new and exclusive process. This process is more efficient and recovers higher percentages of greater purity of used diamond powders.

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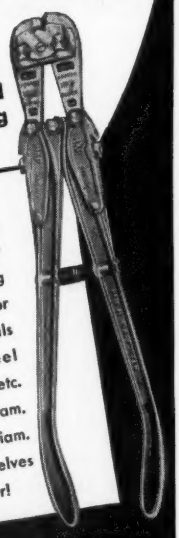

Stand up under the hardest usage. Tough carbide edges firmly brazed to cutting jaws. Excellent for extra hard materials like stainless steel rods, wires, pins, etc. #3 cuts to 5/16" diam. #4 cuts to 3/8" diam. Pay for themselves many times over!

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time, so that it now becomes possible to perform at least as many tests and at the same time know exactly how much better the wire is than the specified minimum. This permits control of the enamel both for overbake as well as underbake.

★ ★ ★

Bibliography

(1) **Repeated Scrape Abrasion Test—J. A. Weh, Wire and Wire Products, Vol. 16, No. 9, (1941).**

(2) **Influence of Measurements on Development of Magnet Wire—F. P. Wilson, Jr. and J. A. Weh, G. E. Review, Vol. 45, No. 11, (November, 1942).**

Lubrication Process for Cold Extrusion

A new phosphate coating and lubricating process, which makes possible the cold extrusion and forming of steel is fully described and illustrated in a 8-page booklet which is available from **Detrex Corporation,** Box 501, Detroit 32, Michigan. This process, identified as Extrudite, is applicable to both carbon and stainless steels.

★ ★ ★

To Develop Asbestos Mine In Africa

Johns-Manville, which operates two asbestos mines in Canada, one of them the world's largest, has announced plans for the immediate development in Africa of a third asbestos mine.

★ ★ ★

The new asbestos ore properties are located in Mashaba in the Victoria District of Southern Rhodesia, about 200 miles south of Salisbury and 120 miles east of Bulawayo.

★ ★ ★

The project is part of Johns-Manville's long range program to maintain adequate supplies of asbestos ore for many years to come, according to A. R. Fisher, President. Johns-Manville is a nationally known manufacturer of building materials, insulations and allied industrial products.

★ ★ ★

The plans call for development of the asbestos ore properties of Rhodesian Asbestos Limited and construction of a small central mill to process asbestos bearing ore extracted

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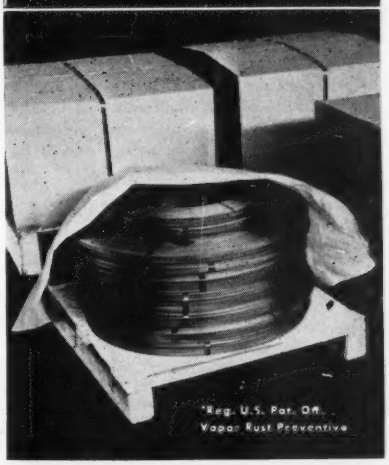
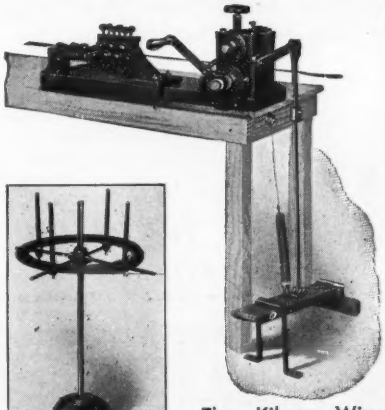
ANGIER VPI* WRAP



*Reg. U.S. Pat. Off. Vapor Rust Preventive

WIRE STRAIGHTENER



The Kilmer Wire straightening and cutting machine is hand operated and recommended for wire No. 8 to No. 19 gauge.
Wire Reel will handle coils up to 150 lbs. with I.D. adjustments from 7" to 22" and 30" O.D.

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from the mine. Rhodesian Asbestos Limited was formed in December, 1951, and is under the direction of Canadian Johns-Manville Company, Ltd., a subsidiary of the American corporation, in association with British Metals Corporation, Ltd., Anglo-Huronian Ltd., Southern Minerals & Marketing Corp., (Pty) Ltd. and the Simon I. Patino interests.

★ ★ ★

James Robert Ewing, a widely experienced mining engineer formerly with Southern Minerals & Marketing Corporation of Southern Rhodesia, has been appointed Mine Manager. Other asbestos mines operated by Johns-Manville include the world's largest at Asbestos, Quebec, and one at Munro Township, near Matheson, in northern Ontario.

Handy and Harmon

Starting 85 years ago as dealers in silver and gold bullion, specie and bonds, **Handy & Harman** today is a fine example of how a company can build its own future by developing new products and markets for them.

★ ★ ★

The company's business today is a far cry from what it was 85 years ago. Today by dint of market and metallurgical research plus aggressive selling, the company has changed its business complexion completely.

★ ★ ★

In place of dealing in bullion, specie and bonds, it now manufactures and supplies the arts and crafts with a large part of the sterling silver, karat gold, anodes for plating, gold and silver solders and gold and silver in special forms which are used in fabricating so many finished articles in the jewelry, silver-smithing and kindred trades.

★ ★ ★

It has pioneered the development of silver alloy brazing and today

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This will be held in Cleveland this year, Nvember 10-14, with headquarters at the Carter Hotel. Please note the change from October to November; full details on pages 884-887.
THE WIRE ASSOCIATION
453 Main St. • Stamford, Conn.

these low temperature brazing alloys are in use in a high percentage of the places where metals are found. Today silver and silver alloys are used on important applications in the manufacture of airplanes, automobiles, air conditioning equipment, refrigerators, turbines, electrical appliances, electronic devices, chemical and food handling equipment, surgical instruments, electrical contacts, etc.

★ ★ ★

These brazing alloys play an important part in both domestic and defense production with uses on shells and rockets and equipment used in fighting planes, tanks, guns and warships. In addition silver as well as gold is being used on the atomic energy projects. The company received 6 Army and Navy "E" Awards during World War II for outstanding production and aid in using silver alloy brazing to speed up the production of fighting equipment.

★ ★ ★

The company's manufacturing efforts, starting around the turn of

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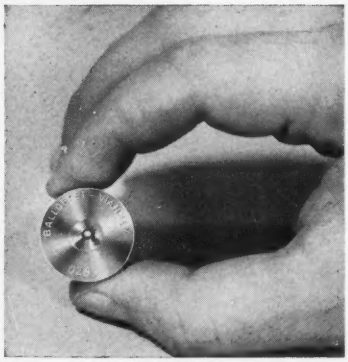

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Adds to Pyrometer Accessories Lines

Several new developments in pyrometer accessories have been announced by the Industrial Division of **Minneapolis-Honeywell Regulator Company.** Among the new numbers the company reported three new types of insulated thermocouple wires and a new screw cover thermocouple head.

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★ ★ ★

The latest wire additions include insulation made of plasticized vinyl chloride for ambient temperature between 20 degrees below zero and 225 degrees above F., a non-impregnated glass for ambient temperatures up to 1200 degrees F., and a fibrous silica for ambient temperatures up to 2000 degrees F.

★ ★ ★

The new screw cover thermocouple head, for power generation, refinery, chemical, glass and ceramic plants, will not freeze or rust. It can be used for single or duplex thermocouple or high-resistance thermometer elements.

★ ★ ★

American Chemical Paints Products Shown at Protective Coatings Exhibit

The Protective Coatings Exhibit, sponsored by **Joseph Mazia**, Consulting Engineer, was held at the Statler Hotel, Washington, D. C., on June 20th.

★ ★ ★

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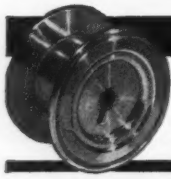
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The main theme of the Exhibit was the application of protective coatings for steel, zinc, and aluminum to military products to increase their durability under service conditions. Purpose of the displays was educational—to show Government personnel how protective coating techniques now standard practice in civilian production can be effectively adapted to military production.

★ ★ ★

Typical applications are discussed in ACP's Technical Bulletins JAN-C-490 (on Granodine), How to obtain Protective Finish to meet MIL-C-5541 Specification (on Alodine) and How to Obtain a Protective Finish on Iron and Steel Parts to Meet U. S. Army Specification 57-0-2, Type 11, Class B. (on Thermoil-Granodizing). These bulletins will be sent by the American Chemical Paint Company, Ambler, Pa., upon request.

★ ★ ★

In addition to the American Chemical Paint Company, two of Mr. Mazia's other clients were represented in the Federal Room: Stoner Mudge, Inc., (Specification Paint Finishes); and Orchard Brothers, Inc., (metal specialties).

★ ★ ★

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Pacific Coast Borax Co., New York, N. Y.

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Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
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Wayne Wire Die Co., Hillside, N. J.

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Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Vascoloy-Ramet Corp., No. Chicago, Ill.
Wayne Wire Die Co., Hillside, N. J.

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Indiana Wire Die Co., Ft. Wayne, Ind.
Metal Carbides Corporation, Youngstown, Ohio
Vascoloy-Ramet Corp., No. Chicago, Ill.

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Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Boulin, Victor J., Inc., New York, N. Y.
Cochaud Wire Die Corp., New York, N. Y.
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Kelly Wire Die Corp., New York, N. Y.
New England Wire Die Co., Worcester, Mass.
North American Philips Co., Inc., New York, N.Y.
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Wayne Wire Die Co., Hillside, N. J.

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Carboloy Dept. of General Electric Co., Detroit, Mich.
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Firth Sterling, Inc., Pittsburgh, Pa.
Metal Carbides Corporation, Youngstown, Ohio
Murex, Ltd., Rainham, England.
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Wayne Wire Die Co., Hillside, N. J.

DIES—Eyelet
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Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Vascoloy-Ramet Corp., North Chicago, Ill.
Wayne Wire Die Co., Hillside, N. J.

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Firth Sterling, Inc., Pittsburgh, Pa.
Hoosier Wire Die, Inc., Ft. Wayne, Ind.
Indiana Wire Die Co., Ft. Wayne, Ind.
Murex, Ltd., Rainham, England.

DIES—Swaging
Murex, Ltd., Rainham, England
Sjogren Tool and Mach. Co., Inc., Auburn, Mass.

DIES—Tube Drawing
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Carboloy Dept. of General Electric Co., Detroit, Mich.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling, Inc., Pittsburgh, Pa.
Indiana Wire Die Co., Fort Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corp., Youngstown, O.
Murex, Ltd., Rainham, England.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Vascoloy-Ramet Corp., North Chicago, Ill.

DRAW BENCHES—
(See MACHINERY—Draw Benches)

DRUMS & TRAVERSES—Flange Steel
Entwistle, Jas. L. Co., Providence, R. I.
Niles Steel Products Division, Republic Steel Corporation, Niles, Ohio

WHERE TO BUY, Continued

DRYING EQUIPMENT—
Carl-Mayer Corp., The, Cleveland, Ohio
Industrial Ovens, Inc., Cleveland, Ohio
Rockwell, W. S. Co., Fairfield, Conn.

ENGINEERS—Consulting
Metal Fatigue—Fatigue of Materials Laboratory, Princeton, N. J.
Wire Mill—Lewis, Kenneth B., Worcester, Mass.
Zinc—Imhoff, Wallace G., Co., No. Highlands, Calif.

EYELETS—Brass or Zinc
Platt Bros. & Co., The, Waterbury, Conn.

FENCING & FENCES—Wire
Interlocking Fence Co., Morton, Ill.

FOAM PRODUCING COMPOUNDS—
American Chemical Paint Co., Ambler, Pa.
Parkin Chemical Co., The, Pittsburgh, Pa.

FURNACES—Brazing
Electric Furnace Co., Salem, Ohio
Harper Electric Furnace Corp., Buffalo, N. Y.
Rockwell, W. S. Co., Fairfield, Conn.
Westinghouse Electric Corp., Industrial Heating Div., Meadville, Pa.

FURNACES—Galvanizing Equipment
Ajax Electric Co., Inc., Philadelphia, Pa.
Electric Furnace Co., Salem, Ohio
Holden, A. F., Co., The, Detroit, Mich.
Rockwell, W. S. Co., Fairfield, Conn.
Surface Combustion Corp., Toledo, Ohio
Trauwood Engineering Co., The, Cleveland, Ohio
Wilson, Lee, Engr. Co., Cleveland, Ohio

FURNACES—Heat Treating
Ajax Electric Co., Inc., Philadelphia, Pa.
Carl Mayer Corp., The, Cleveland, Ohio
Electric Furnace Co., Salem, Ohio.
Holden, A. F., Co., The, Detroit, Mich.
Morrison Industries, Bedford, Ohio.
Rockwell, W. S., Co., Fairfield, Conn.
Surface Combustion Corp., Toledo, Ohio
Trauwood Engr. Co., Cleveland, Ohio.
Westinghouse Electric Corp., Industrial Heating Div., Meadville, Pa.
Wilson, Lee, Engr. Co., Cleveland, Ohio

FURNACES—Lead Melting
Electric Furnace Co., Salem, Ohio
Rockwell, W. S. Co., Fairfield, Conn.
Surface Combustion Corp., Toledo, Ohio
Westinghouse Electric Corp., Industrial Heating Div., Meadville, Pa.

FURNACES—Pot (oil, gas, electric)
Ajax Electric Co., Inc., Philadelphia, Pa.
Holden, A. F., Co., The, Detroit, Mich.
Westinghouse Electric Corp., Industrial Heating Div., Meadville, Pa.

FURNACES—Resistance Heating, Strand
(See Annealing Machines)

FURNACES—Salt Bath
Ajax Electric Co., Inc., Philadelphia, Pa.
Electric Furnace Co., Salem, Ohio
Holden, A. F. Co., The, Detroit, Mich.
Rockwell, W. S. Co., Fairfield, Conn.
Surface Combustion Corp., Toledo, Ohio
Westinghouse Electric Corp., Industrial Heating Div., Meadville, Pa.

GALVANIZING EQUIPMENT — (See MACHINERY—Galvanizing Wire)

GRINDERS—Roll
Norton Co., The, Worcester, Mass.

HAMMERS—Swaging
Sjogren Tool and Machine Co., Auburn, Mass.

HOOKS—Pickling & Liming
Bronze Die Casting Co., Pittsburgh, Pa.
Heil Process Equipment Corp., Cleveland, Ohio
Youngstown Welding & Eng'g. Co., Youngstown, Ohio

HOISTS—Electric Travelling
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., Wickliffe, Ohio

IMPREGNATING MATERIALS—
Solar Compounds Corporation, Linden, N. J.

INHIBITORS—Pickling
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Parkin Chemical Co., The, Pittsburgh, Pa.

INSULATING MATERIALS—
Glass Fibers, Inc., Toledo, Ohio
Heineman Corp., Oscar, Chicago, Ill.
Merrimac Paper Co., New York, N. Y.
New England Lacquer Co., E. Providence, R. I.
Solar Compounds Corporation, Linden, N. J.
Solar Varnish Corp., Linden, N. J.

INSULATING MATERIALS—Paper—For Electric Wire Cable.
Merrimac Paper Co., New York, N. Y.
Solar Compounds Corporation, Linden, N. J.
Solar Varnish Corp., Linden, N. J.

LACQUERING SYSTEMS — See MACHINERY—Lacquering Electric Wire

LACQUERS—For Electric Wire
New England Lacquer Co., E. Providence, R. I.
Solar Compounds Corporation, Linden, N. J.

LAME—LAHN—
Montgomery Co., The, Windsor Locks, Conn.

LIME—
Warner Co., Philadelphia and Bellefonte, Pa.

LUBRICANTS — For Metal Cutting, Stamping and Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Magnus Chemical Co., Garwood, N. J.
Miller, R. H., Co., Inc., Homer, N. Y.
Nopco Chemical Co., Harrison, N. J.
Standard Industrial Compounds Co., Chicago, Ill.

LUBRICANTS—Wire Drawing
(See Compounds—Wire Drawing)

LUBRICANTS—Wire Rope
Swift & Co., Chicago, Ill.

LUMBER—Wire Mill, Carload shipments for lagging and car blocking
North Anson Reel Co., No. Anson, Me.

MACHINERY—Armoring (Cable, Wire Hose)
American Insulating Mach'y Co., Phila., Pa.
Sleeper & Hartley, Inc., Worcester, Mass.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc., (used), Pawtucket, R. I.

MACHINERY—Barbed Wire
Glader Machine Works, Chicago, Ill.
Wean Engineering Co., Cleveland, Ohio

MACHINERY—Bolts & Rivets
Meyer, Roth & Pastor Maschinenfabrik, Koln-Raderberg, Germany

MACHINERY—Braiding
Fidelity Machine Co., Inc., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Solomon, Michael, New York, N. Y.
Wardwell Braiding Machine Co., Central Falls, R. I.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R.I.

MACHINERY—Bunching
Cook Manufacturing Co., The, Paterson, N. J.
Federal Manufacturing Co., Wallingford, Conn.
Haskell-Dawes Machine Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R.I.

MACHINERY—Bundling, Scrap
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Cable, Electric
American Insulating Mach'y Co., Phila., Pa.
Fidelity Machine Co., Inc., Philadelphia, Pa.
Haskell-Dawes Machine Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Capstans (See Machinery—Wind-Up)

MACHINERY—Chain Making
Meyer, Roth & Pastor Maschinenfabrik, Koln-Raderberg, Germany
Nilson, A. H. Machine Co., Bridgeport, Conn.

MACHINERY—Closing Rope
Watson Machine Co., Paterson, N. J.

MACHINERY—Coiling Rod
Vaughn Mach'y Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

MACHINERY—Cold Heading
Waterbury-Farrel Fdry. Mach. Co., Waterbury, Conn.

MACHINERY—Copper Wire Drawing
Aetna-Standard Engineering Co., Pittsburgh, Pa.
American Insulating Mach'y Co., Phila., Pa.
Fenn Manufacturing Co., The, Hartford, Conn.
National Mach'y Exch. (Used), New York, N. Y.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

MACHINERY—Covering Wire (See MACHINERY—Insulating Wire)

MACHINERY—Cutting
Eisler Engineering Co., Newark, N. J.
Lewis Machine Co., The, Cleveland, Ohio
Mettler Machine Tool, Inc., New Haven, Conn.
Porter, H. K., Inc., Somerville, Mass.
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Descaling Rod, Dry
Fisher Associates, New York, N. Y.

MACHINERY—Die Making
Victor J. Boulin, Inc., New York, N. Y.
Carboloy Dept. General Electric Co., Detroit, Mich.

MACHINERY—Descaling Rod, Dry
Firth Sterling, Inc., Pittsburgh, Pa.
Kelly Wire Die Corp., New York, N. Y.
Dykrex Corp., Roos Tool & Mfg. Div., Newark, N. J.
Wayne Wire Die Co., Hillside, N. J.

MACHINERY—Draw Benches
Aetna-Standard Engineering Co., Pittsburgh, Pa.
Morgan Construction Co., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Wartenweiler, Emilio, Milano, Italy

MACHINERY—Edging (See MACHINery — Tandem Rolling and Edging Mills)

MACHINERY—Enameling
American Insulating Mach'y Co., Phila., Pa.
Cook Manufacturing Co., The, Paterson, N. J.
Industrial Ovens, Inc., Cleveland, Ohio
Michigan Oven Co., Detroit, Mich.

MACHINERY—Extruding
Aetna-Standard Engineering Co., Pittsburgh, Pa.
National Rubber Machinery Co., Akron, Ohio
Royle, John, & Sons, Paterson, N. J.
Standard Machinery Co., Mystic, Conn.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Fence
Glader, Wm., Machine Works, Chicago, Ill.
Interlocking Fence Co., Morton, Ill.
Malmedie Maschinenfabrik, Dusseldorf, Germany
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Filament Coil Winding
Eisler Engineering Co., Newark, N. J.

MACHINERY—Flat Wire
Fenn Manufacturing Co., The, Hartford, Conn.
Mettler Machine Tool, Inc., New Haven, Conn.
Torrington Mfg. Co., Torrington, Conn.
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Forming Wire
Baird Machine Co., Stratford, Conn.
Nilson, A. H., Machine Co., Bridgeport, Conn.

MACHINERY—Galvanizing Wire
Sleeper & Hartley, Inc., Worcester, Mass
Steel Equipment Co., Cleveland, Ohio
Vaughn Machinery Co., Cuyahoga Falls, O.
Wean Equipment Corp., Cleveland, O.
Wilson, Lee, Engr. Co., Cleveland, Ohio

MACHINERY—Gang Winders
Entwistle, Jas. L. Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Grinding
Norton Co., The, Worcester, Mass.

MACHINERY—Insulating Wire
Aetna-Standard Engineering Co., Pittsburgh, Pa.
American Insulating Mach'y Co., Phila., Pa.
Ets. Pourtier Frères, Romainville, France
Fidelity Machine Co., Inc., Philadelphia, Pa.
National Rubber Machinery Co., Akron, Ohio
New England Butt Co., Providence, R. I.
Royle, John & Sons, Paterson, N. J.
Solomon, Michael, New York, N. Y.
Syncro Machine Co., Perth Amboy, N. J.
Wardwell Braiding Machine Co., Central Falls, R.I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Knitting
Fidelity Machine Co., Inc., Philadelphia, Pa.

MACHINERY—Lacquering Electric Wire
American Insulating Mach'y Co., Philadelphia, Pa.
Industrial Ovens, Inc., Cleveland, O.

MACHINERY—Lock Washer
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Looms, Wire Weaving
Interlocking Fence Co., Morton, Ill.

MACHINERY—Material Handling (See Material Handling Equipment)

MACHINERY—Measuring Wire & Cable
Davis Electric Co., Wallingford, Conn.
Durant Mfg. Co., Milwaukee, Wis.
Entwistle, Jas. L. Co., Providence, R. I.
New England Butt Co., Providence, R. I.
Standard Mill Supply Co., Pawtucket, R. I.
Watson Machine Co., Paterson, N. J.

WHERE TO BUY, Continued

MACHINERY—Nail and Tack
Baird Machine Co., The, Stratford, Conn.
Glader, Wm., Machine Works, Chicago, Ill.
Meyer, Roth & Pastor Maschinenfabrik, Koln-Raderberg, Germany
National Mach'y Exch. (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Pickling
Chemsteel Construction Co., Pittsburgh, Pa.
Youngstown Welding & Eng'g. Co., Youngstown, Ohio

MACHINERY—Pin Making
Baird Machine Co., The, Stratford, Conn.

MACHINERY—Pointing
Aetna-Standard Engineering Co., Pittsburgh, Pa.
Meyer, Roth & Pastor Maschinenfabrik, Koln-Raderberg, Germany
Morgan Construction Co., Worcester, Mass.
National Mach'y Exch. (Used), New York, N. Y.
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Poultry Wire Fencing
Interlocking Fence Co., Morton, Ill.
Malmedie Maschinenfabrik, Dusseldorf, Germany
Wean Equipment Corp., Cleveland, O.

MACHINERY—Power Transmission
Reeves Pulley Company, Columbus, Indiana

MACHINERY—Pre-Heater for Wire (for Extrusion of Plastics)
Industrial Ovens, Inc., Cleveland, Ohio
National Rubber Machinery Co., Akron, Ohio

MACHINERY—Re-Spoolers
Boyd & Sons Manufacturing Corp., Philadelphia, Pa.
Davis Electric Co., Wallingford, Conn.
Eisler Engineering Co., Newark, N. J.
Emory, Robert J., Co., Newark, N. J.
Entwistle, Jas. L. Co., Providence, R. I.
National Mach'y Exch. (Used), New York, N. Y.
Steel Equipment Co., Cleveland, Ohio
Vaughn Machinery Co., Cuyahoga Falls, O.
Watson Machine Co., Paterson, N. J.
Wean Equipment Corp., Cleveland, Ohio
Wire & Textile Mach'y, Inc. (used) Pawtucket, R.I.
Wire Insulating Machy., Inc., Manchester, Conn.

MACHINERY—Rod Mill
Morgan Construction Co., Worcester, Mass.
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Rolling Mill
Morgan Construction Co., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.
Wean Engineering Co., Cleveland, Ohio

MACHINERY—Rubber Insulating
National Rubber Machinery Co., Akron, Ohio
Royle, John & Sons, Paterson, N. J.
Standard Machinery Co., Mystic, Conn.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R.I.

MACHINERY—Spark Testing
Davis Electric Co., Wallingford, Conn.
Entwistle, Jas. L. Co., Providence, R. I.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R.I.

MACHINERY—Spring Making
Carlson Company, The, New York, N. Y.
National Mach'y Exch. (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Wells, Frank L., Co., Kenosha, Wisc.

MACHINERY—Staple
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Straightening & Cutting
Fenn Manufacturing Co., The, Hartford, Conn.
Kilmer, M. D., & Co., Cleveland, Ohio
Lewis Machine Co., The, Cleveland, Ohio
Mettler Machine Tool Co., New Haven, Conn.
Meyer, Roth & Pastor Maschinenfabrik, Koln-Raderberg, Germany
National Mach'y Exch. (Used), New York, N. Y.
Wartenweiler, Emilio, Milano, Italy
Wells, Frank L., Co., Kenosha, Wisc.

MACHINERY—Stranding
Haskell-Dawes Machine Co., Philadelphia, Pa.
Hughesville Machine & Tool Co., Hughesville, Pa.
Milton Machine Works, Inc., Milton, Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Swaging
Fenn Manufacturing Co., The, Hartford, Conn.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.

MACHINERY—Take-Up and Pay-Out
Aetna-Standard Engineering Co., Pittsburgh, Pa.
American Insulating Mach'y Co., Phila., Pa.
Davis Electric Co., Wallingford, Conn.
Federal Manufacturing Co., Wallingford, Conn.
Industrial Ovens, Inc., Cleveland, Ohio
Marshall-Richards Machine Co., Inc., Trenton, N.J.
Standard Machinery Co., Mystic, Conn.
Standard Mill Supply Co., Pawtucket, R. I.
Watson Machine Co., Paterson, N. J.
Wire Insulating Machy., Inc., Manchester, Conn.

MACHINERY—Taping
American Insulating Mach'y Co., Phila., Pa.
Ets. Pourtier Frères, Romainville, France
New England Butt Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R.I.

MACHINERY—Testing, Physical
Scott Testers, Inc., Providence, R. I.

MACHINERY—Tinning Wire
American Insulating Mach'y Co., Phila., Pa.
Cook Manufacturing Co., The, Paterson, N. J.
Steel Equipment Co., Cleveland, Ohio
Syncro Machine Co., Perth Amboy, N. J.
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Tinsel Rolling Mills
American Insulating Mach'y Co., Phila., Pa.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Trolley Wire
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Tube Mill, Cold Drawing
Aetna-Standard Engineering Co., Pittsburgh, Pa.
Marshall-Richards Machine Company, Inc., Trenton, N. J.
Mettler Machine Tool, Inc., New Haven, Conn.

MACHINERY—Tube Winders
Solomon, Michael, New York, N. Y.

MACHINERY—Twinning
(See Mach.—Bunching)

MACHINERY—Twisters, Wire
Cook Manufacturing Co., The, Paterson, N. J.
Davis Electric Co., Wallingford, Conn.
Federal Manufacturing Co., Wallingford, Conn.
Haskell-Dawes Machine Co., Philadelphia, Pa.

MACHINERY—Used
National Machinery Exchange, New York, N. Y.
Solomon, Michael, New York, N. Y.
Wire & Textile Machy., Inc., Pawtucket, R. I.

MACHINERY—for Wire Welding (See WELDERS—Butt and Spot)

MACHINERY—Winding Wire
Eisler Engineering Co., Newark, N. J.
Entwistle, Jas. L., Co., Providence, R. I.
Federal Manufacturing Co., Wallingford, Conn.
New England Butt Co., Providence, R. I.
Standard Mill Supply, Pawtucket, R. I.
Watson Machine Co., Paterson, N. J.
Wire Insulating Machy., Inc., Manchester, Conn.

MACHINERY—Wire Bending
Eisler Engineering Co., Newark, N. J.
Kilmer, M. D., & Co., Cleveland, Ohio

MACHINERY—Wire Drawing
Aetna-Standard Engineering Co., Pittsburgh, Pa.
Cook Manufacturing Co., The, Paterson, N. J.
Fenn Manufacturing Co., The, Hartford, Conn.
Herborn Maschinenfabrik Herborn, Germany.
Marshall-Richards Machine Co., Inc., Trenton, N.J.
Morgan Construction Co., Worcester, Mass.
Morgardshammers Mekaniska Verksbod, Morganshammer, Sweden.
National Mach'y Exch. (Used), New York, N. Y.
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Steel Equipment Co., Cleveland, Ohio
Syncro Machine Co., Perth Amboy, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Wire Forming
Baird Machine Co., The, Stratford, Conn
Kilmer, M. D., & Co., Cleveland, Ohio
National Mach'y Exch. (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Wire Rope
Milton Machine Works, Inc., Milton, Pa.
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Wrapping with Paper
Angier Corporation, The, Framingham, Mass.
Marshall-Richards Machine C., Inc., Trenton, N. J.
Terkelsen Machine Co., Boston, Mass.

MATERIAL HANDLING EQUIPMENT—
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., Wickliffe, O.

MILLS—Tandem, Rolling & Edging
Torrington Mfg. Co., Torrington, Conn.
Wean Equipment Co., Cleveland, Ohio

NAILS—Wire
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Keystone Steel & Wire Co., Peoria, Ill.
Roebling, John A. Sons Co., Trenton, N. J.
Wickwire Brothers, Inc, Cortland, N. Y.

OVENS—Cable Lacquering
American Insulating Mach'y Co., Phila., Pa.
Carl-Mayer Corp., The, Cleveland, Ohio
Industrial Ovens, Inc., Cleveland, Ohio
Morrison Industries, Bedford, Ohio
Westinghouse Electric Corp., Industrial Heating Div., Meadville, Pa.

OVENS—Rod Bakers
Carl-Mayer Corp., The, Cleveland, Ohio
Michigan Oven Co., Detroit, Mich.
Morrison Industries, Bedford, Ohio

OVENS—Welding Rod Coating
Carl-Mayer Corp., The, Cleveland, Ohio
Industrial Ovens, Inc., Cleveland, Ohio
Morrison Industries, Bedford, Ohio

PAINT—Acid Proof
Ceilcote Company, Cleveland, Ohio

PAINT BONDING CHEMICALS—
American Chemical Paint Co., Ambler, Pa.

PAINTS—Heat Resisting
American Chemical Paint Co., Ambler, Pa.
Solar Compounds Corp., Linden, N. J.

PAPER—Creped Wrapping
Angier Corporation, The, Framingham, Mass.
Arkell Safety Bag Co., New York, N. Y.
Terkelsen Machine Co., Boston, Mass.

PAPER—For Coil Wrapping and Corrosion Prevention
Angier Corporation, The, Framingham, Mass.
Arkell Safety Bag Co., New York, N. Y.
Terkelsen Machine Co., Boston, Mass.

PATENT ATTORNEYS—
Lancaster, Allwine & Rommel, Washington, D. C.

PAY-OUT SYSTEMS—(See MACHINERY—Take-Up & Pay-Out)

PHOSPHATE COATING CHEMICALS—(See COMPOUNDS—Phosphate Coating)

PICKLING COMPOUNDS—
See (Inhibitors—Pickling)

PICKLING—Hooks, etc. Acid Resisting
Bronze Die Casting Co., Pittsburgh, Pa.
Youngstown Welding & Eng'g. Co., Youngstown, Ohio

PICKLING TANK LININGS—
Chemsteel Construction Co., Pittsburgh, Pa.
Haveg Corp., Newark, Del.
Heil Process Equipment Corp., Cleveland, Ohio

PIPES & FITTINGS—Acid Resistant
Haveg Corp., Newark, Del.
Heil Process Equipment Corp., Cleveland, Ohio

POTS—Lacquer
Industrial Ovens, Inc., Cleveland, Ohio

PRESSES—Hydraulic and Mechanical
Aetna-Standard Engineering Co., Pittsburgh, Pa.
Standard Machinery Co., Mystic, Conn.

PULLERS AND GRIPS—For Wire
Morgan Construction Co., Worcester, Mass.
Scudder, E. J. Fdry & Mach. Co., Trenton, N. J.
Siogren Tool and Machine Co., Auburn, Mass.
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
Wean Equipment Corp., Cleveland, Ohio

REEL AND TENSION STANDS—
Davis Electric Co., Wallingford, Conn.
Entwistle, Jas. L. Co., Providence, R. I
Fidelity Machine Company, Inc., Philadelphia, Pa.
Industrial Ovens, Inc., Cleveland, Ohio.
Kilmer, M. D., & Co., Cleveland, Ohio
Roll-A-Reel, Cincinnati, Ohio.
Sleeper & Hartley, Inc., Worcester, Mass.
Standard Mill Supply Co., Pawtucket, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.
Wire Insulating Machy., Inc., Manchester, Conn.

WHERE TO BUY, Continued

REEL CRUTCHES—
Roll-A-Reel, Cincinnati, Ohio
Watson Machine Co., Paterson, N. J.

REELS & SPOOLS—Aluminum Alloy
Acrometal Products, Inc., Minneapolis, Minn.
Milton Machine Works, Inc., Milton, Pa.

REELS & SPOOLS—Annealing and Stranding
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Howsam Spool Co., Aurora, Ill.
Milton Machine Works, Inc., Milton, Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Niles Steel Products Div., Republic Steel Corp. Niles, Ohio

REELS & SPOOLS—Steel (All Types)
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Clark, J. L., Mfg. Co., Rockford, Ill.
Howsam Spool Co., Aurora, Ill.
Mason Can Company, East Providence, R. I.
Milton Machine Works, Inc., Milton, Pa.
Mossberg Pressed Steel Corp , Attleboro, Mass.
Niles Steel Products Div., Republic Steel Corp Niles, Ohio

REELS & SPOOLS—Wooden
Acrometal Products, Inc., Minneapolis, Minn.
American Woodworking Co., Chicago, Ill.
Bridge Mfg. Co., Inc., The, Hazardville, Conn.
Carris Reels, Inc., Rutland, Vt.
Durkee Mfg. Co., Pine River, Minn.
Nelson Company, The, Baltimore, Md.
North Anson Reel Co., No. Anson, Me.
Winchester Reel Co., Ashuelot, N. H.

REELS—Metal Bound
Durkee Mfg. Co., Pine River, Minn.
Howsam Spool Co., Aurora, Ill.
McCaskie, Inc., Wm., Westport, Mass.
North Anson Reel Co., No. Anson, Me.

REELS—Plywood
Carris Reels, Inc., Rutland, Vt.
McCaskie, Inc., Wm., Westport, Mass.
Nelson Company, The, Baltimore, Md.
Winchester Reel Co., Ashuelot, N. H.

REELS—Wire Mill
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Bridge Mfg. Co., The, Hazardville, Conn.
Carris Reels, Inc., Rutland, Vt.
Dykrex Corp., Roos Tool & Mfg. Div., Newark, N.J.
Durkee Mfg. Co., Pine River, Minn.
Howsam Spool Co., Aurora, Ill.
Mason Can Company, East Providence, R. I.
Milton Machine Works, Inc., Milton, Pa.
McCaskie, Inc., Wm., Westport, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Mettler Machine Tool, Inc., New Haven, Conn.
Niles Steel Products Div., Republic Steel Corp. Niles, Ohio
North Anson Reel Co., No. Anson, Me.
Winchester Reel Co., Ashuelot, N. H.

REFRACTORIES—High Temperature
Norton Company, Worcester, Mass.

ROD BAKERS— (See Ovens—Rod Bakers)

RODS—Stainless Steel
American Steel & Wire Co., Cleveland, Ohio
Pittsburgh Steel Co., Pittsburgh, Pa.

RODS—Wire—Non-Ferrous
American Brass Co., The, Waterbury, Conn.
Platt Bros. & Co., The, Waterbury, Conn.

RODS—Wire, Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Indiana.
Erie Iron & Supply Corp., Erie, Pa.
Fabrikant Steel Products, Inc., New York, N. Y.
Gerber, J., & Co., Inc., New York, N. Y.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Company, Pittsburgh, Pa.
Roebling's, John A., Sons Co., Trenton, N. J.
Youngstown Sheet & Tube Co., Youngstown, O.

ROPE—Wire
American Steel & Wire Company, Cleveland, O.
Bethlehem Steel Co., Bethlehem, Pa.
Roebling's John A., Sons Co., Trenton, N. J

RUST PROOF COMPOUNDS—
(See Compounds—Rust Preventing)

RUST REMOVING COMPOUNDS—
(See Compounds—Rust Preventing)

SALTS—Heat Treating, Descaling, etc.
Holden, A. F., Co., The, Detroit, Mich.

SATURATION SYSTEMS—
Industrial Ovens, Inc., Cleveland, Ohio
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R.I.

SOAPS—Industrial and Wire Drawing
(See Compounds—Wire Drawing)

SODIUM—for Descaling
Holden, A. F., Co., The, Detroit, Mich.

SPOOLS—(See Reels & Spools)

SPOOLS—Stamped Metal for Retail Wire Sales
Clark, J. L. Mfg. Co., Rockford, Ill.
Mason Can Co., East Providence, R. I.

STAMPINGS—Steel
Acrometal Products, Inc., Minneapolis, Minn.
Art Wire and Stamping Co, Newark, N. J.
Mossberg Pressed Steel Corp., Attleboro, Mass.

STRIP—Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Roebling's John A., Sons Co., Trenton, N. J.
Youngstown Sheet & Tube Co., Youngstown, O.

TANKS—Compound
Watson Machine Co., Paterson, N. J.

TANKS—Pickling and Plating
Ceilcote Company, Cleveland, Ohio
Chemsteel Construction Co., Pittsburgh, Pa.
Heil Process Equipment Corp., Cleveland, Ohio

TESTERS — INSULATION (See MACHINERY—Spark Testers)

TESTING EQUIPMENT (See MACHINERY Testing, Physical)

TINNING PROCESS—
Metal & Thermit Corp., New York, N. Y.

TINSEL—Electric Conductor
Montgomery Co., The, Windsor Locks, Conn.

TINSEL WIRE—Resistance, Lame, Decorative Cords Thread—Bare Copper, Silver and False Gold Coated, etc. (See TINSEL—Electric Conductor)

TOOLS—Wire Cutting
Porter, H. K., Inc., Somerville, Mass.

TRAMRAIL SYSTEMS—
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, O.

TRANSMISSIONS—Variable speed (See Machy—Power Transmission)

TRAVERSES & DRUMS—For Reels
(See Drums & Traverses)

TRAVERSE MECHANISMS—
Apco Mossberg Co., Attleboro, Mass.
New England Butt Co., Providence, R. I.
Niles Steel Products Div., Republic Steel Corp. Niles, Ohio
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R.I.
Wire Insulating Machy., Inc., Manchester, Conn.

TUBE BENDERS AND FORMERS—
Kilmer, M. D., & Co., Cleveland, Ohio

TURKS HEADS—
Fenn Manufacturing Co., The, Hartford, Conn.

VALVES & FITTINGS—Acid Resistant
Haveg Corp., Newark, Del.

VARNISHES—for Electric Wire
N. E. Lacquer Co., E. Providence, R. I.
Solar Varnish Corporation, Linden, N. J.

VULCANIZING PANS AND EQUIPMENT
American Insulating Mach'y Co., Phila., Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Wire Insulating Machy., Inc., Manchester, Conn.

WELDERS—Spot and Butt
Eisler Engineering Co., Newark, N. J.
Micro Products Co., Chicago, Ill.

WIRE—Aluminum
Elmet Division, North American Philips Company, Inc., Lewiston, Maine
Malin & Co., Cleveland, Ohio
Seneca Wire & Manufacturing Co., Fostoria, Ohio

WIRE—Barbed
Gerber, J., & Co., Inc., New York, N. Y.
Interlocking Fence Co., Morton, Ill.

WIRE—Brass
American Brass Co., The., Waterbury, Conn.
Chase Brass & Copper Co., Waterbury, Conn.

WIRE—Brush
Gerber, J., & Co., Inc., New York, N. Y.
Groma Trading Corp., New York, N. Y.

WIRE—Cast
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Cold Heading
American Steel & Wire Co., Cleveland, Ohio
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Erie Iron & Supply Corp., Erie, Pa.
Gerber, J., & Co., Inc., New York, N. Y.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.
Roebling's John A., Sons Co., Trenton, N. J.
Seneca Wire & Manufacturing Co., Fostoria, Ohio
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Copper
American Brass Co., The, Waterbury, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Gerber, J., & Co., Inc., New York, N. Y.

WIRE—Flat, Fine
Anchor Wire Corp., Jamaica, L. I., N. Y.
Elmet Division, North American Philips Company, Inc., Lewiston, Maine
Gerber, J., & Co., Inc., New York, N. Y.
Groma Trading Corp., New York, N. Y.
Montgomery Co., The, Windsor Locks, Conn.

WIRE—Forming
Art Wire and Stamping Co, Newark, N. J.
Pittsburgh Cut Wire Co., Pittsburgh, Pa.

WIRE—Galvanized
Fabrikant Steel Products, Inc., New York, N. Y.
Gerber, J., & Co., Inc., New York, N. Y.

WIRE—Manufacturers
American Steel & Wire Co., Cleveland, Ohio
Bethlehem Steel Co., Bethlehem, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
Continental Steel Corp., Kokomo, Ind.
Gerber, J., & Co., Inc., New York, N. Y.
Groma Trading Corp., New York, N. Y.
Johnson Steel & Wire Co., Worcester, Mass.
Keystone Steel & Wire Co., Peoria, Ill.
Newbury Co., The, Boston, Mass.
Pittsburgh Steel Co., Pittsburgh, Pa.
Roebling's, John A., Sons Co., Trenton, N. J.
Seneca Wire & Manufacturing Co., Fostoria, Ohio
U. S. Steel Co., N. Y., N. Y.
Wickwire Brothers, Inc., Cortland, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Music
American Brass Co., The, Waterbury, Conn.
American Steel & Wire Co., Cleveland, Ohio
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Malin & Co., Cleveland, Ohio
Newbury Co., The, Boston, Mass.
Seneca Wire & Manufacturing Co., Fostoria, Ohio
Specialty Wire Co., Inc., Worcester, Mass.

WIRE—Nickel Silver and Phosphor Bronze
American Brass Co., The, Waterbury, Conn.
Groma Trading Corp., New York, N. Y.
Malin & Co., Cleveland, Ohio.
Chase Brass & Copper Co., Waterbury, Conn.

WIRE—Oil Tempered
Pittsburgh Steel Co., Pittsburgh, Pa.

WIRE—Spring
American Brass Co., The, Waterbury, Conn.
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Gerber, J., & Co., Inc., New York, N. Y.
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Keystone Steel & Wire Co., Peoria, Ill.
Newbury Co., The, Boston, Mass.
Pittsburgh Steel Co., Pittsburgh, Pa.
Seneca Wire & Manufacturing Co., Fostoria, Ohio
Specialty Wire Co., Inc., Worcester, Mass.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Stainless Steel
American Steel & Wire Co., Cleveland, Ohio
Firth Sterling, Inc., Pittsburgh, Pa.
Pittsburgh Steel Co., Pittsburgh, Pa.
Specialty Wire Co., Inc., Worcester, Mass.
Wire Corporation, Worcester, Mass.

WIRE—Steel—Also Coppered and Galvanized Steel
Anchor Wire Corp., Jamaica, L. I., N. Y.
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Erie Iron & Supply Corp., Erie, Pa.
Gerber, J., & Co., Inc., New York, N. Y.
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.
Seneca Wire & Manufacturing Co., Fostoria, Ohio
U. S. Steel Export Co., New York, N. Y.
Wickwire Brothers, Inc., Cortland, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Straightening and Cutting
Art Wire and Stamping Co., Newark, N. J.
Erie Iron & Supply Corp., Erie, Pa.
Pittsburgh Cut Wire Co., Pittsburgh, Pa.
Wickwire Brothers, Inc., Cortland, N. Y.

WIRE—Tungsten
North American Philips Co., Inc., Allied Products Division, New York, N. Y.

WIRE—Zinc
Platt Bros. & Co., The, Waterbury, Conn.

WRAPPING PAPER—Creped (See PAPER—Creped Wrapping)

YARNS & TAPES—
Glass Fibers, Inc., Toledo, Ohio

YARN TESTERS—
Heineman Corp., Oscar, Chicago, Ill.
Scott Testers, Inc., Providence, R. I.

The WATSON MACHINE COMPANY

ESTABLISHED 1845

PATERSON 3, NEW JERSEY, U. S. A.

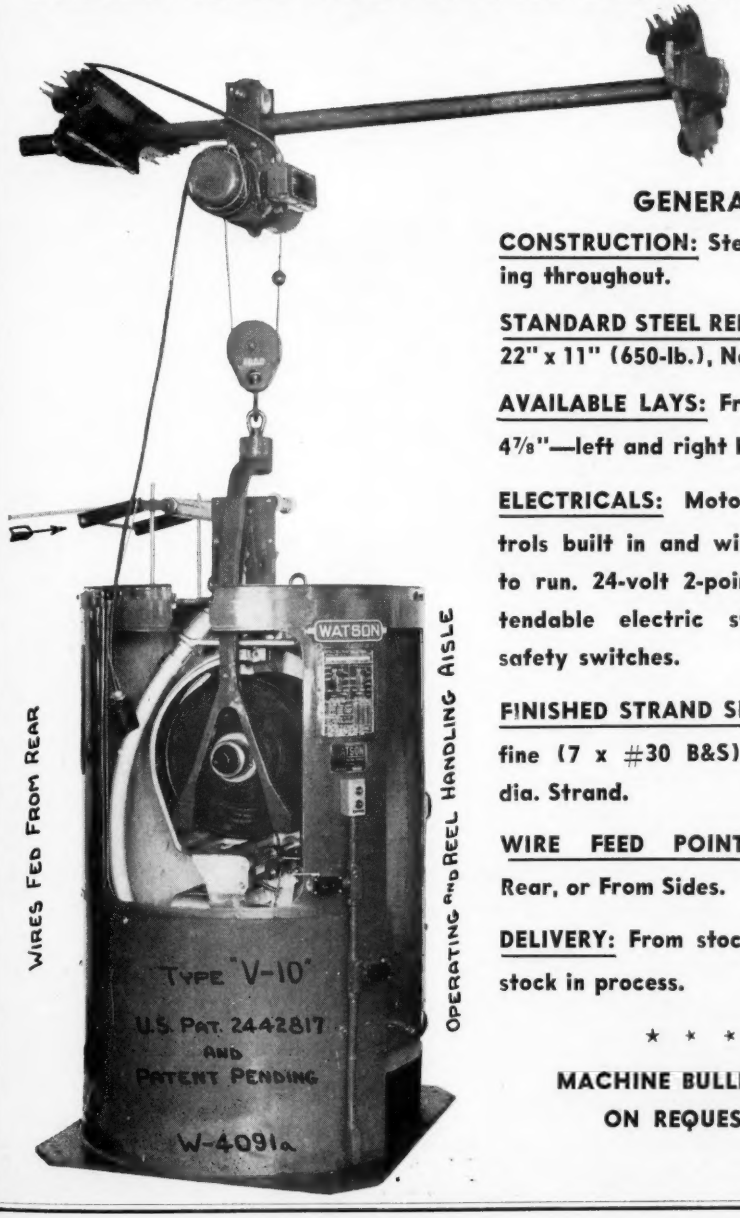
ELECTRICAL WIRE AND CABLE, WIRE ROPE, CORDAGE
AND MASTICATING MACHINERY MANUFACTURERS

WATSON

VERTICAL BUNCHERS TYPE "V"

IN WORLD-WIDE USE, THESE VERTICAL DESIGNS OFFER THE FOLLOWING OUTSTANDING ADVANTAGES:

1. HIGHEST POSSIBLE PRODUCTION AT LONG RUNS ON LARGE STANDARD WIRE TAKEUP REELS.
2. SMALLEST POSSIBLE FLOOR SPACE, AND IDEAL FOR ROW MOUNTING IN LIMITED SPACE.
3. LOW PURCHASE COST, ACHIEVED BY QUANTITY PRODUCTION.



GENERAL SPECIFICATIONS.

CONSTRUCTION: Steel, heat treated alloys and ball bearing throughout.

STANDARD STEEL REELS: No. 7—16" x 8" (250-lb.), No. 9—22" x 11" (650-lb.), No. 10—24" x 14" (1000-lb).

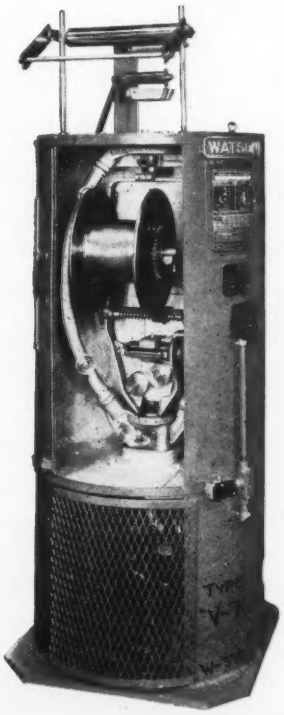
AVAILABLE LAYS: From 1/8" to 4 7/8"—left and right hand twist.

ELECTRICALS: Motor & Controls built in and wired, ready to run. 24-volt 2-point and extendable electric stop. Door safety switches.

FINISHED STRAND SIZES: From fine (7 x #30 B&S) to 5/16" dia. Strand.

WIRE FEED POINTS: Front, Rear, or From Sides.

DELIVERY: From stock, or from stock in process.



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MACHINE BULLETINS ON REQUEST

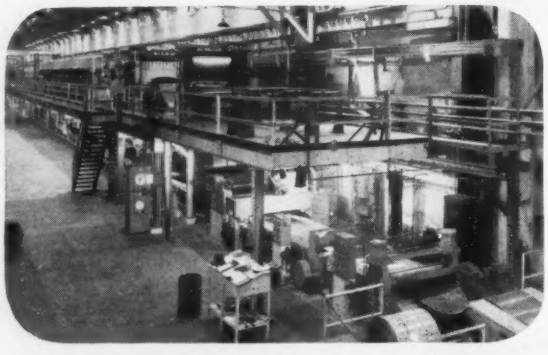
9-52

Galvanizing

Aluminizing

Bright Annealing and Normalizing Strip ------ Continuously

Strip in single or multiple strands up to a total width of 54" may be bright annealed or normalized, continuously, in this EF gas fired radiant tube installation. Capacity 7200 lbs. per hour.



A large capacity continuous strip normalizing, annealing and galvanizing unit. This is a combination EF gas fired radiant tube and electrically heated installation and is over 400 feet long.

We are in position to design, build and put in operation; continuous strip lines for hot or cold rolled, high or low carbon, stainless, silicon, tinplate, aluminum, brass, bronze or any other ferrous or non-ferrous strip — for bright annealing, normalizing, galvanizing, aluminizing, tinning or any other process — in the size and type best suited to your plant, process, product or production requirements.

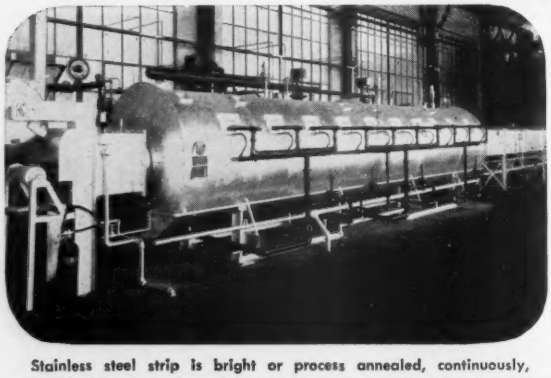
Send for printed matter showing outstanding production furnaces we have built for handling wire and wire products.

Put your production furnace problems up to experienced engineers — *it pays*.

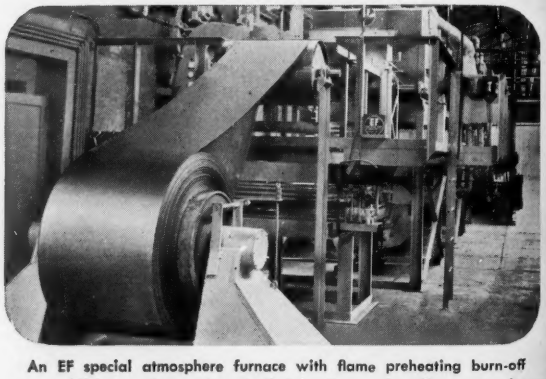
THE ELECTRIC FURNACE CO.

Salem, Ohio

Gas Fired, Oil Fired and Electric Furnaces



Stainless steel strip is bright or process annealed, continuously, in this EF gas fired special atmosphere tube muffle type furnace. It also handles other strip requiring lower temperatures.



An EF special atmosphere furnace with flame preheating burn-off or oxidizing section and controlled heating and cooling zones for producing various surface conditions on strip.